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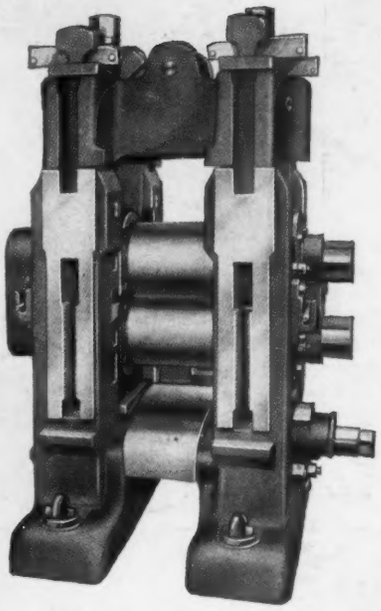
STEEL

MAR 12 1937

For forty-eight years—IRON TRADE REVIEW

March 12, 1931



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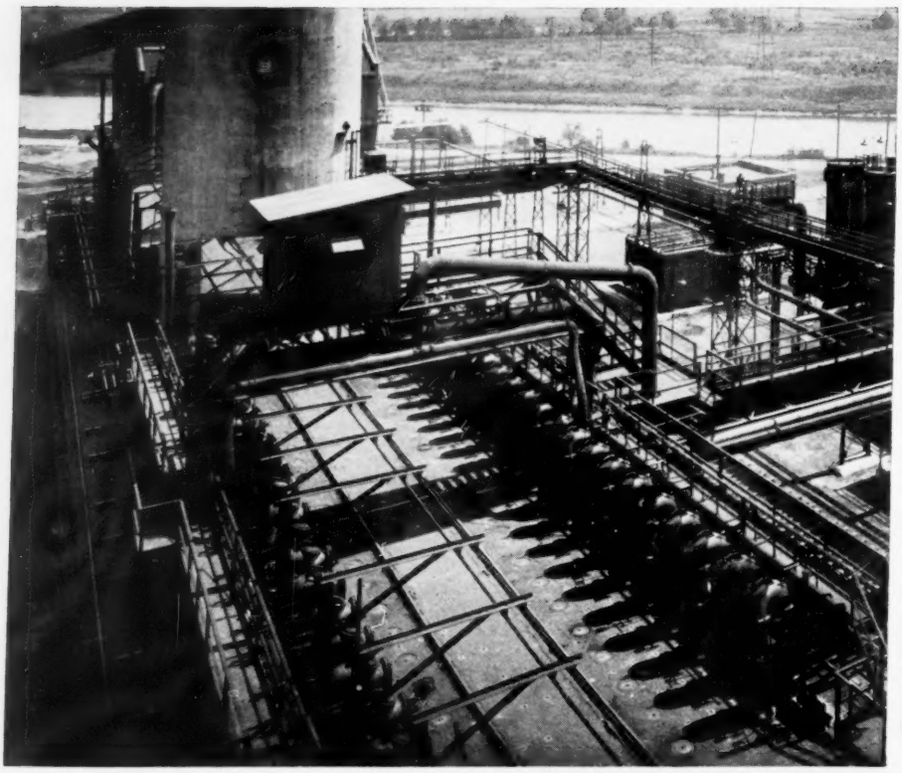

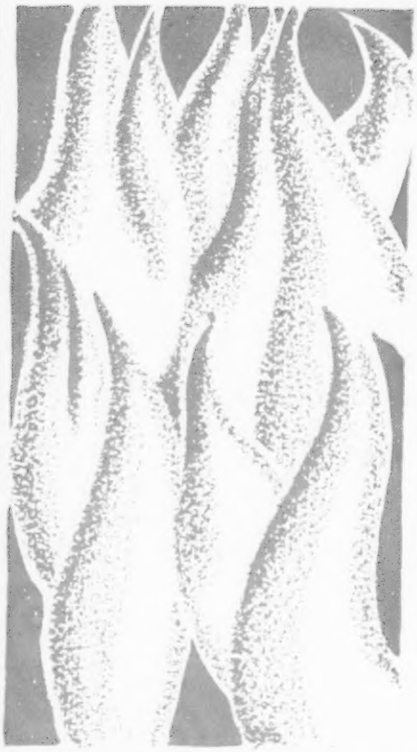

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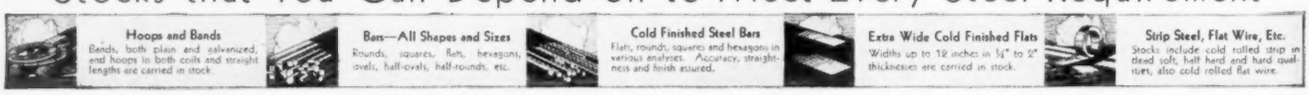
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Volume 89 Number 11

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

A CAPRICIOUS, undependable month is March. From the standpoint of steel it can be defended or assailed with equal facility and conviction. With a third of the month gone, a good case statistically can be made out for it. On the other hand, the lethargy of consumers may easily persuade that the gains of January and February sapped the markets of their virility, and whatever improvement develops by midsummer will be a crawl.

Undeniably, sentiment is depressed this week, and there is nothing in the market situation resembling the robust Marches of previous years. The decline of 4.04 per cent in unfilled tonnage of the Steel corporation (Page 20) is disheartening. But — steelworks operations have advanced from the 52.6 per cent average for February (Page 20) to 55-56 per cent this week. Such major steel outlets as building and pipe have provided substantial orders. In advancing prices, producers evidence a long-range confidence.

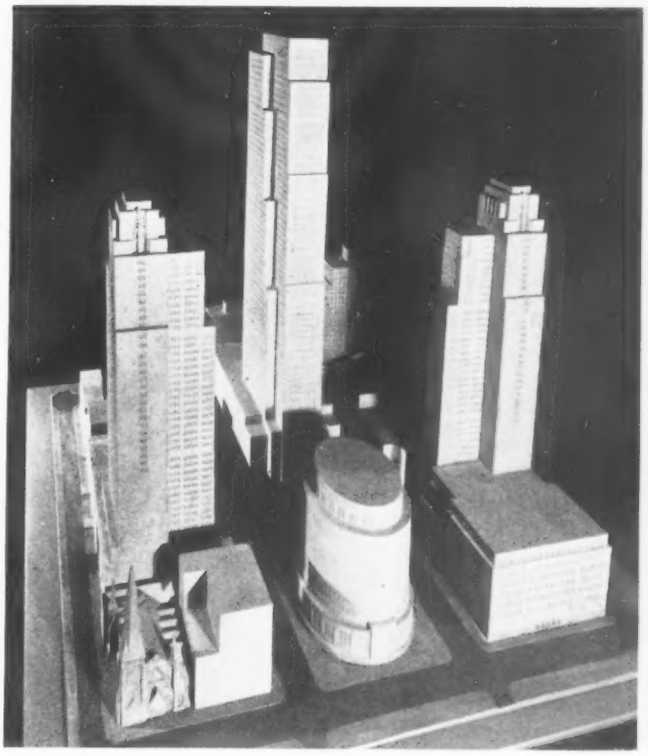
What is probably happening is that the industry is recuperating after its plunges of January and February. In fact, the increase in steel output last month was above the average. In the past 5 years the ingot rate in February gained 8.5 per cent; in the past 10 years 6.3 per cent (Page 27); the February, 1931, advance was 14.5 per cent. So much store is set by March as an indicator that snap judgment should not be taken. Appraising it by the first ten days may be like viewing an oil painting at too close range.

Earnings Should Be Slightly Higher

With the first quarter nearly completed, earnings will shortly command as much attention as tonnage. The verdict on the quarter will depend entirely upon the comparison. Over the final quarter of 1930 some producers will report moderate improvement; measured with the lush opening of 1929 and 1928 the showing will be miserable. . . . Current billings for many products are no lower (Page 75) than 90 days ago, and for a few are slightly higher. Making due allowance for shrinkage in the rate of improvement, about 100,000 tons more pig iron and 500,000 tons more steel will be made this quarter than last. . . . However, normally the first quarter of the steel year contributes almost a third of the year's earnings; 1931 will not be normal.

Continent Turns Again to Co-Operation

In England, Germany, France, Belgium, the story of steel parallels that of the United States. . . . Producers on the Continent, groping for a way out, are instinctively turning to co-operation, and although they made a failure of their steel entente they are being driven (Page



Said to be the largest private building enterprise ever attempted, the Rockefeller "radio city" in New York, a model of which is depicted above, will require 125,000 tons of structural steel

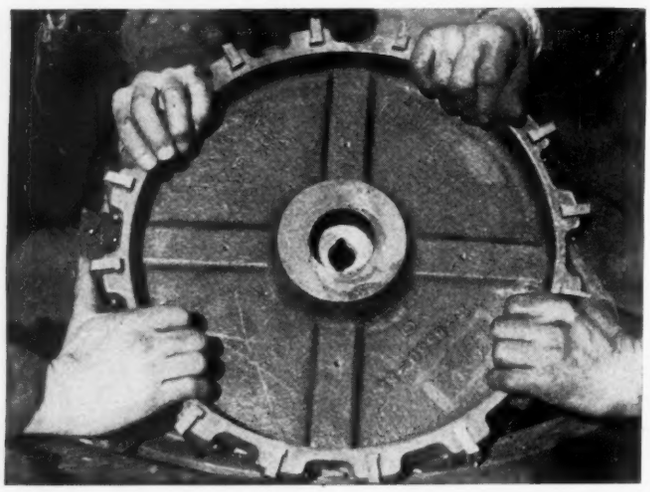
104) to rear another edifice on the substructure of the almost-forgotten entente. . . . The British, meanwhile, believe they can help their situation by making another attempt (Page 102) to corral all domestic business, and in their emergency they will trade-mark their steel.

No Schwab Veto on Bethlehem Bonus

Never is Charles M. Schwab so colorful as in a fight, and now at 71 he is plunging his dynamic personality into an engagement with dissenting stockholders to prove (Page 19) that the bonus system of the Bethlehem Steel Corp. is meritorious and that a steel executive can earn a million dollars a year. . . . At Youngstown, combating more dissenting stockholders, Bethlehem's counsel have filed (Page 19) an appeal in error in the Bethlehem-Sheet & Tube merger appeal, which may not reach the top of the docket until June. . . . Personality, it appears, is not limited to leaders like Mr. Schwab, but even steel has it. At the recent Western Metal congress at San Francisco it was pointed out (Page 48) that steels with approximately the same chemical characteristics and subjected to the same heat treatment may behave in entirely different fashion, due to their "personality" or "timbre."

Next War on One-Price Basis

Something like 15 billion dollars still is owing on the last war, but Washington already is preparing for the next one. One recommendation to the war policies committee is that the President "freeze" all prices, from commodities to labor, the moment war is declared and set up (Page 17) a war industries board. . . . Something akin to war in a competitive way is likely to result when the Rockefellers begin placing (Page 21) the 125,000 tons of structural steel for their "radio city" in New York. . . . War on the underlying causes of unemployment is urged (Page 18) by the National Metal Trades association, which brands present remedies as mere palliatives. . . . Unemployment insurance appears a panacea of "pinks" (Page 26).



Acme-P. & A. Photo

Should Sir Hubert Wilkins' submarine Nautilus, with which he is to explore the Arctic, become caught under arctic ice this 16-blade cutter head on a 20-foot ice drill will bore a vertical tunnel to the surface, providing escape

Manganese Fight Now in Headlines

Interred with the 71st congress are a number of resolutions (Page 17) which would have kept the manganese pot boiling all summer. Since congress adjourned without sanctioning any economic investigation and the treasury ruled recently there was no dumping of Russian ore, all's quiet on the manganese front. . . . This is not displeasing to the Russians, who will have 30,000 American tractors, costing $45,000,000 with combines and spare parts, cultivating collective farms (Page 17) this spring. . . . This buying by Russia is on a scale which export managers at New York were told (Page 16) is necessary if the United States is to maintain its position in the export world: Mass distribution must complement mass production.

Skullcrackers on Scrap Program

Alligator shears were stilled this week as leading scrap dealers congregated at Cleveland (Page 15) for the annual convention of their institute. Among other things, they mapped out a 5-year program for their industry. . . .Smoothly as this convention was run, it does not compare with a new drive (Page 54) for finishing rolls in galvanizing pots, eliminating all chatter in the coating rolls. . . . It is almost uncanny to press a button, note a flash of lamps on a traveling crane and witness the cover of a soaking pit rolled back to permit the removal of an ingot (Page 37). A press on the same button replaces the cover. . . . The new books in business satisfy every taste for reading (Page 57) from European cast iron to telephone selling.

Briny Test for New Alloy Steels

The new corrosion-resistant steels will go down to the sea in ships (Page 44) if the navy research laboratory reports favorably on tests now being conducted and recommends their specification for naval construction shortly to be undertaken. . . . With the wider use of these new steels have developed new problems in pickling. An eastern company is utilizing (Page 51) a bright-dip process, comprising electrolytic tanks, washes and rinses by which light scale is removed in 5 minutes. . . . At the Western Metal congress one speaker pointed out (Page 50) that although the 18-8 steels perform admirably up to 1200 degrees Fahr., further research is required to increase their stability at higher temperatures.

Problems of Scrap Industry Weighed at Convention

TAKING account of its accomplishments in three years of existence and laying plans for future activities in forwarding the steel and iron scrap industry, its central organization, the Institute of Scrap Iron and Steel Inc., is holding its third annual convention in Cleveland March 10, 11 and 12.

Contacting with other branches of the steel and iron industry at many points and influenced by various factors in general business, the scrap industry finds it can do much for itself by proper application of business methods, by research and by efforts to modify and direct activities and methods which have grown up in the past without direction.

Trade relations, railroad classifications, costs, uses of scrap in various processes, these all had their due consideration at the hands of the 150 representatives of the industry. In the development of the institute from its small beginning three years ago it has been found that many lines of activity of great value to the trade have been opened and progress has been made in directions which give a better understanding of the value of collection and utilization of scrap steel and iron, both as a valuable raw material and as a means of conserving natural resources in iron ore, coal and limestone.

Arbitration Use Growing

Internally, machinery has been developed to settle differences between members of the trade, and an arbitration tribunal was in session throughout the meetings before which members placed their cases for settlement. This is a distinct gain for the industry and its existence is a deterrent to many practices that formerly existed.

An early and important matter was taken up at the first round table session, on Tuesday, when Murray N. Billings, traffic manager of the Illinois Steel Co., Chicago, and chairman of the Pittsburgh consumers and producers scrap committee, a contact body between the industry, the railroads and the interstate commerce commission, explained the things his committee were seeking to do and what it has accomplished.

Mr. Billings explained that scrap is the most complicated material his company has to deal with in its traffic department as it consists of so many classifications, whereas other items are simple and easy to describe. The most important work on which his committee has been engaged is resistance to the evident plan of the interstate commerce commission to place scrap rates on a practical mileage basis, by making its rates a percentage of the rate on iron and steel products, which are on a mileage basis.

The institute believes that scrap rates should be based on competitive conditions, each case being decided on its own merits, under the circumstances that prevail at a given point. This has been successful to the extent that following protest by the committee the commerce commission has refrained from making any general order to this effect. In this move the scrap industry has the support of the steel producing element, as it is assumed that pig iron and semifinished steel would follow the same rule later.

Study Scrap Editorials!

The editorials in Steel, issue of Feb. 19, 1931, "How Scrap Sellers Can Cooperate To Build Market," and "Scrap an International Factor in Steel Industry," issue of March 5, 1931, should be studied by every member.—E. G. Howell, chairman, research committee, Institute of Iron and Steel Scrap Inc., to round table session on research.

Another important point handled by the traffic committee is the matter of a satisfactorily descriptive definition of scrap. The current definition includes the proviso that the material must be for "remelting only." As some grades do not come within this definition it has been suggested that the only common factor is "discarded as unfit for original use."

The situation now rests in an undecided position, railroads for the most part accepting at the scrap rate such material as is generally recognized as scrap, whether within or without the definition. Until the institute or some other interest brings up the matter for a definite ruling it is believed the matter will remain undecided.

Research of Great Value

One of the important activities of the institute, has been developed by the committee on research which was instituted about 18 months ago. E. G. Howell, Chicago, its chairman, reported on its efforts and its accomplishments. It set out to conduct a survey of consumption and production. The former has been completed and two reports have been formulated on the latter.

It has engaged in a campaign on education in costs. A full session of the present meeting was devoted to various aspects of this matter.

In the study of alloy steel scrap a substantial start has been made. Co-operation of the government was sought in connection with the census of distribution and manufactures, and this has been accomplished, with the figures now on file.

Ample matters remain as food for research, Mr. Howell said, such as the great tonnage of ferrous metal allowed to go entirely to waste in city dumps because coated with tin, paint or zinc, for which no means of utilization have been evolved. Since

STEEL DECK FORMS A CURVED ROOF

That it is possible to apply a steel sheet roof deck to a warped surface, which curves in two or more directions at the same time, recently was demonstrated on a building at Fort Wayne, Ind. About 15,700 square feet of 20-gage roof deck built by the Detroit Steel Products Co., Detroit, was installed

other organizations have found great value in the work of a metallurgical engineer, he suggested that such a move by the institute would result in much value to the trade in finding outlets for their materials where none now exists. He also advised co-operation with various research foundations and bureaus connected with the steel industry, the United States government and similar agencies.

A matter pressing to the fore in the automobile industry and equally important to the scrap industry is that of scrapping automobiles through some systematic plan. A session was devoted to this matter and a mark of 3,000,000 cars annually was set as a necessity to save the material which otherwise would go to waste in discarded cars. Automotive companies were represented in this discussion of means to handle this pressing question. At present, not more than 500,000 cars are scrapped annually, it is estimated. By handling 3,000,000 cars annually a total conservation of 1,500,000 tons of steel would result and the total saving in iron ore and other natural resources would be close to 7,500,000 tons.

Benjamin Schwartz, director general of the institute, is confident that a definite plan can be worked out to present to the National Automobile Chamber of Commerce for its support for a systematic plan for scrapping this large number annually, taking them from the hands of wreckers who utilize only part of the materials which could be salvaged. Co-operation of the automotive industry to make this a paying proposition is necessary.

W. W. Kerlin, of the Gray Iron institute, Cleveland, called attention of the scrap men to the value of studying the analysis needs of his customers, through contact with the consumer's chemist or foreman. This is because the gray iron foundry does not have as full control of his melted metal as the steel plant and must rely to considerable extent on the analysis of the metal he charges into his cupola. Use of scrap, he said, gives cast iron of the present a strength not dreamed of by foundrymen of ten years ago.

The Gray Iron institute, he said, is endeavoring to bring about a standard analysis of various classes of castings and when this is done the scrap dealer will know exactly what anaysis he has in the various items as they come to his yard. Cast iron car wheels long have been under this standard analysis and they are handled without question as to their value in melting.

H. A. Schwartz, manager of research for the National Malleable & Steel Castings Co., Cleveland, explained in his paper the considerations that guide the choice of scrap for malleable foundries. Use of a high percentage of scrap from risers, sprues and defective castings makes it necessary to choose the remainder of the charge with much attention to the analysis. Gray iron is too variable in this respect and malleable scrap is favored because of its fairly constant silicon content and its ability to carry more pig iron than other grades. Alloy steel can not be used at all.

Say Mass Distribution Is Necessary for Successful Export Business

MASS distribution is a stern necessity if American manufacturers are going to realize the full potentialities of export markets. This was emphasized at the recent "get together" meeting of the Export Managers' club of New York at the Hotel Pennsylvania, New York. Better knowledge of foreign markets also was stressed. Another need is the carrying out of engineering projects for customers abroad.

More than 700 attended the one-day session, which was concluded with a banquet, at which Louis E. Pierson, chairman, Irving Trust Co.; J. T. Tripp, president of the Pan-American Airways, and John B. Kennedy, associate editor of *Colliers' Weekly*, were the principal speakers.

A. Schoonmaker, export manager, Republic Steel Corp., New York, pointed to the importance of close co-operation between the export manager and the production department. The export manager, he declared, should prepare the production department for the possible peculiarities of export orders, particularly the different standards of measurements, units of quality, labeling and packing, among various other items.

It also is important, the speaker said, fully to familiarize the credit manager with certain demands that are certain to arise in selling material abroad. Much, he said, is to be accomplished by a direct contact with customers.

This latter thought was stressed by Mr. Pierson, who declared that American manufacturers must get closer to their work in foreign fields, adding that foreign travel by employes should be encouraged. This speaker stressed mass distribution:

"The practical phases of distribution have been explored and organized far less thoroughly than have the economics of production. Yet distribution and production are like two hands. They must work together to accomplish a skillfully designed result."

Sheet Mill Workers Offer To Take Wage Cut

Youngstown, O., March 10.—Conference between sheet mill workmen affiliated with the Amalgamated Association of Iron, Steel and Tin Workers and the management of one independent valley sheet concern is being arranged on a program of ways and means to increase the company's business.

The workmen have expressed a willingness to accept a revision of the tonnage wage rates until general trade conditions improve. Usually such a plan has been discouraged by the union leaders as well as the rank and file.

One Cleveland sheet mill about six weeks ago made such a wage arrangement with its long-time union sheet mill workmen and the mill has been busy ever since.

Hope to Reopen Plant of Eastern Steel Co.

Philadelphia—Local business men of Pottsville, Pa., declaring a syndicate closed the Eastern Steel Co. plant and acted in restraint of trade, plan an appeal to the department of justice to undertake proceedings for reopening the plant. Operations were suspended March 1 by order of receivers. Pottsville citizens have raised $300,000 to place the mill in condition to operate and say they can duplicate this amount. What is believed to be a majority of outstanding bonds was recently purchased through Samuel K. Phillips & Co., Philadelphia brokers, for an unnamed client. With a par of $1000, the bonds were bid in at $116.

Ford's Reported Purchase Revives Furnace Rumor

A report that the Ford Motor Co. has purchased a 175-acre industrial tract at Gladstone, Mich., ten miles from Escanaba, is not confirmed by the Ford company at Fordson, Mich., though it is reliably stated E. G. Kingsford, Ford representative in the upper peninsula of Michigan, announced the purchase. The report has revived rumors heard for the past two years that the company contem-

plates building a blast furnace in the upper peninsula.

The company acquired about 1300 acres of iron ore land on the Menominee range in the past year. Gladstone is a shipping point on Lake Michigan for the Menominee district. Ore from the Marquette range, on which the company has two mines in production, goes to Marquette, and the South Shore railroad is building a new dock there, presumably with assurances from ore producers that the usual amount of ore will be shipped from that port.

Circumstantial evidence points to preparations for large-scale developments by the Ford company on the Menominee range and at Gladstone, though official confirmation is lacking.

Kalman Retires from East?

Kalman Steel Co., Chicago, is understood to be closing its New York and Philadelphia offices and its two plants in the Philadelphia district are reported in the trade as being offered for sale. Stocks are being liquidated. The company, it is understood, will maintain its Chicago and Buffalo reinforcing bar outlets.

Are Low on Navy Tanks

Hampton Roads, Va.—McCay & Kirtland, Buffalo, were low bidders for the construction of steel tanks, department of yards and docks at this station with a bid of $25,490.

The Business Week in Washington

CONGRESS should pass a law enabling the President, immediately war is declared, to "freeze" commodity prices, wage rates, interest rates, rents, commissions and fees, was the recommendation of Bernard Baruch, former chairman of the war industries board, at a hearing of the war policies committee. He also urged the setting up of machinery to create a counterpart of the war industries board.

□ □ □

In the fiscal year beginning July 1 the navy department will start construction of 11 new ships. It is stated that contracts for the building of ten destroyers and one destroyer leader will probably be placed shortly after July 1.

□ □ □

In accordance with a senate resolution, the federal trade commission will investigate the relationship between contractors on government construction work and supply dealers to ascertain whether price-fixing exists.

Manganese Probe Demands Die with 71st Congress

WASHINGTON—With congress having adjourned March 4 without final action on several resolutions and the treasury department having found there was no dumping here of Russian manganese, the manganese situation seems likely to continue without official action for a number of months.

Barring a special session of congress, which is not probable, congressional action on manganese before the session convening Dec. 7 is impossible. Presumably, unless startling new facts are disclosed, the treasury department will stand on its no-dumping decision.

The publicity campaign of domestic producers of manganese, who are at loggerheads with large steel producers, designed to increase the consumption of the domestic ore is likely to continue unabated, however.

One resolution which died automatically when congress adjourned March 4 would have authorized a subcommittee of the house ways and means committee to conduct an economic investigation into the manganese industry, also to explore the relations of important steel producers, who are partial to foreign manganese, with the Amtorg Trading Corp., Russian buying organization in this country.

A resolution for a probe of the recent merger of the Bethlehem Steel Corp. and McClintic-Marshall Co. also failed.

Surprisingly little legislation directly affecting business was passed at the session of congress just ended, which session set a new peacetime record for appropriations, having authorized the expenditure of $5,250,000,000. Legislation like bonus certificate loans, of course, affect business and industry indirectly.

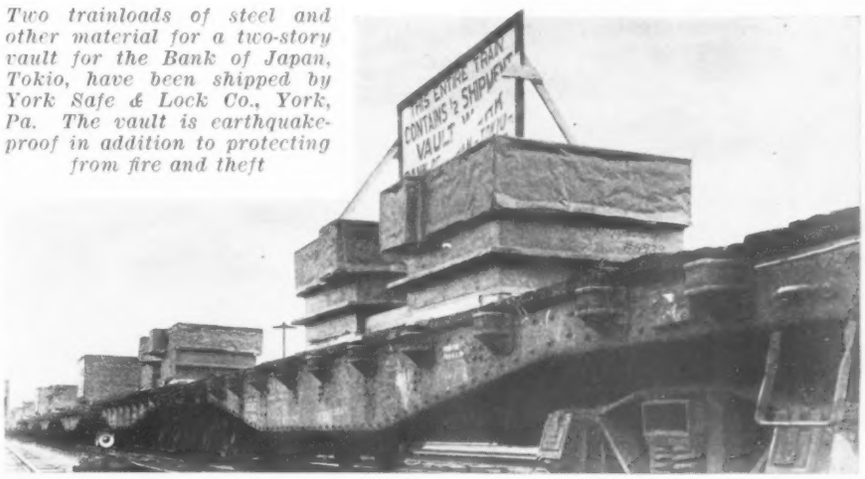
In spite of the many clashes and the over-riding of his veto on the bonus bill, President Hoover emerged with more victories than congress. His veto of the Muscle Shoals bill was sustained. The effort of congress to dominate the President failed. The threats of forcing an extra session also were in vain.

Soviet Takes 30,000 Tractors for Spring

Shipment of 29,963 American tractors, purchased by the Amtorg Trading Corp. in August, 1930 for the 1931 spring sowing campaign in the Soviet Union has just been completed, according to an announcement made yesterday by Peter A. Bogdanov, chairman, Amtorg Trading Corp., New York. A total of 31 steamers was required to carry this machinery. Tractors were shipped to the soviet ports of Odessa, Novorossik and Batum on the Black sea, Vladivostock on the Pacific coast, and Murmansk on the Arctic ocean.

Of the total number of tractors shipped, 95 per cent were wheel tractors while the rest were of the track-laying type. The machines totaled 585,000 horsepower pulling capacity and were equally divided among the light, medium and heavy types, ranging from 9/18 to 50/60 horsepower.

Shipments of American combine harvesters to the U. S. S. R., to the value of $6,000,000, have already been started. Total value of tractors, spare parts and combines purchased by the Amtorg Trading Corp. for use in 1931 is $45,000,000.



Two trainloads of steel and other material for a two-story vault for the Bank of Japan, Tokio, have been shipped by York Safe & Lock Co., York, Pa. The vault is earthquake-proof in addition to protecting from fire and theft

Metal Trades Survey Aims at Employment Stabilization

ANY attempt to relieve distress incident to unemployment can be nothing but a temporary measure. A permanent cure can be effected only by removing, one by one, the causes underlying unemployment. Proposed measures for state and federal unemployment insurance or doles are unwise, and if enacted will not advance the welfare of the American people.

These are some of the conclusions arrived at by the committee on industrial relations of the National Metal Trades association, Chicago, after a study of answers to a questionnaire on the subject of stabilizing metal trades employment. The committee includes Dr. Otto P. Geier, Cincinnati Milling Machine Co.; Morris E. Leeds, Leeds & Northrup Co., Philadelphia; R. G. A. Phillips, American Multigraph Co., Cleveland, and H. A. Sedgewick, Cutler-Hammer Mfg. Co., Milwaukee. This committee was assisted by an advisory council including seven representatives of well-known manufacturing companies. The association is composed of 1100 member shops, normally employing 1,250,000 to 1,500,000 persons.

The questionnaire went into considerable detail as to causes of unemployment and means for stabilizing employment. The committee in its conclusions strongly recommends to members that they give more attention to causes and effects of variations in operations and labor forces.

"The cumulative effect of such procedures will not only help to smooth out the curve of employment in our own industry but will also spread to others," the report states. "What can be done is within the management's own province, both within the confines of a particular business and throughout society as a whole."

The committee recommends further development of the technique of budgeting of sales, production, buying and "man-load"; co-operation in the collection of and research on trade statistics; operation of shops on a flexible week basis; standardization and simplification; encouragement of consumer co-operation in buying which will encourage greater anticipations of changes in requirements and commitments; encouragement of well-balanced personnel programs, and participation in civic affairs to assist in the preparation of public works and governmental buying at opportune times.

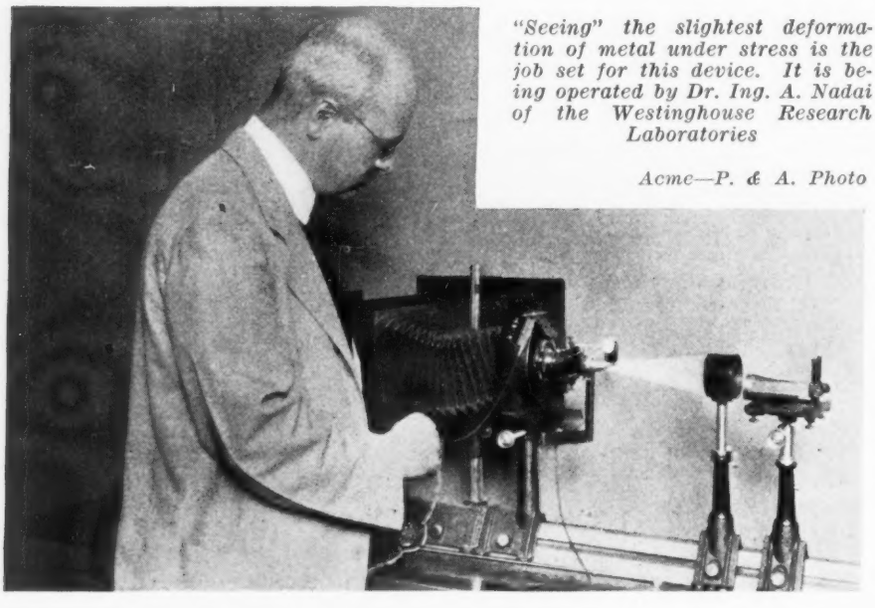
More Applicants In Busy Times

"Perhaps the greatest single contribution customers could make to the stabilization of business is the anticipation of requirements, thereby avoiding rush orders," the committee states.

"One extremely interesting and somewhat inexplainable fact revealed by the committee's study," it says further, "is the relative increase in the number of applicants for work during the peak periods of 1929. This may be largely accounted for by the rather high rate of labor turnover usually prevailing in periods of intense industrial activity; but weighting the curves to eliminate the effects of labor turn-over still shows a remarkable increase in applicants.

"The inference is that in the metal trades at least there was a greater supply of available labor during 1929 than during the four preceding years, in spite of the fact 1929 was a banner year. The committee is not sure of the source from which this apparent surplus of labor came, but is definitely aware that the employment situation in the early part of 1930 was aggravated by an influx of workers apparently attracted from other industries."

The committee's findings are reported in a 30-page booklet, giving all the data developed by the survey.



"Seeing" the slightest deformation of metal under stress is the job set for this device. It is being operated by Dr. Ing. A. Nadai of the Westinghouse Research Laboratories

Acme—P. & A. Photo

Heavy Machinery Builders Keeping Normal Personnel

Washington—Employment conditions in the heavy machinery industry are in marked contrast to what might have been expected ten years ago, W. C. Fulmer, secretary, Machinery Builders society, New York, has reported to the President's emergency employment committee.

The industry employs approximately 100,000 persons in normal times. This number might have been cut to 30 or 40 per cent, but production schedules have been arranged so that most or all of the normal personnel have been given work part time. One plant has run continuously full time and expects to do so for at least three more months.

January Iron and Steel Employment Off 1 Per Cent

Washington — Employment and payrolls in iron and steel and allied industries decreased in January, according to the bureau of labor statistics. Reports from 199 iron and steel plants gave their December employment as 228,577, which was reduced 1.1 per cent to 226,006 in January. Their weekly payrolls fell 4.9 per cent, from $5,689,861 to $5,413,666.

Forty cast iron pipe plants showed a reduction of 2.9 per cent in employment, and 7.9 per cent in payrolls. Employment in 180 structural shops was reduced 5.7 per cent, and payrolls 10.7 per cent. Reports from 149 machine tool plants indicated a drop of 5 per cent in employment and 9.1 per cent in payrolls.

Steelworkers Back on Job

Atlanta, Ga.—The Atlantic Steel Corp., one of the largest employers

of labor in this territory, is putting back all employes who were laid off during the fall and winter months, according to N. C. Harrison, president. The company normally employs about 750 men, half of whom had been laid off. Business has improved and the company also desired to relieve unemployment.

Bar Iron Mill Wage Rates Are Unchanged

Wage rates in bar iron mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will remain unchanged for March and April, puddlers receiving $10.30 a ton. The average sales price in January and February remained 1.70c per pound. Further comparisons:

	1931	1930	1929
Jan.-Feb.	1.70c	1.95c	2.00c
March-April	.....	1.90c	2.00c
May-June	.....	1.90c	2.00c
July-Aug.	.....	1.80c	2.00c
Sept.-Oct.	.....	1.80c	2.00c
Nov.-Dec.	.....	1.70c	2.00c
Yearly average..		1.841c	2.00c

Eighteen Stockholders Join Suit Against Bonus

Newark, N. J.—Eighteen more stockholders in the Bethlehem Steel Corp. have joined the original four who filed a suit in the New Jersey chancery court to compel the officers and directors to repay bonuses, said to aggregate $36,000,000 or more, paid since 1911. The 18 combined hold 3000 common shares, while the four held less than 1000 shares. The Newark suit also seeks to enjoin further bonus payments.

Scrap Tonnage for 1929 Now 36,000,000 Tons

Total steel and iron scrap consumed in the United States in 1929, as gathered in the biennial census of manufacturers, referred to in STEEL, March 5, page 23, should be 36,263,501 gross tons instead of 50,035,799 tons.

After issuance of the bulletin containing the consumption figures it was discovered by the bureau of the census that 13,772,298 tons produced and reworked in steel plants had been included in the tonnage purchased, contrary to desire of the bureau. Correction by the census bureau was issued too late to prevent publication of the error in STEEL.

Continue Shovel Standard

Washington—The simplified practice recommendation on shovels, spades and scoops has been extended unchanged for one year by the department of commerce.

Schwab Asks Stockholders To Approve Bonus System

CHARLES M. SCHWAB, chairman, Bethlehem Steel Corp., has addressed to stockholders a letter describing in full the corporation's bonus system and asking them to give his administration of the plan a vote of approval at the annual meeting April 14. The system was adopted by stockholders in 1917, and the letter includes an exhibit of all the bonus payments since.

At the outset, Mr. Schwab makes it clear that there was no secrecy concerning the system and its administration. He quotes from his own public addresses in which he referred to the $1,000,000 compensation for E. G. Grace, president of the corporation.

The letter points out that the Bethlehem bonus system is not a new policy in the steel industry. Incentive payments were originated nearly 50 years ago by Andrew Carnegie. Mr. Schwab adopted the principle when he acquired Bethlehem in 1901.

Mr. Schwab states that Mr. Grace has been worth $1,000,000 a year and more to Bethlehem in its complex problems of financial and industrial development. Mr. Grace's bonus compensation, based as it is on earnings, has grown only because the earnings of the corporation have increased correspondingly.

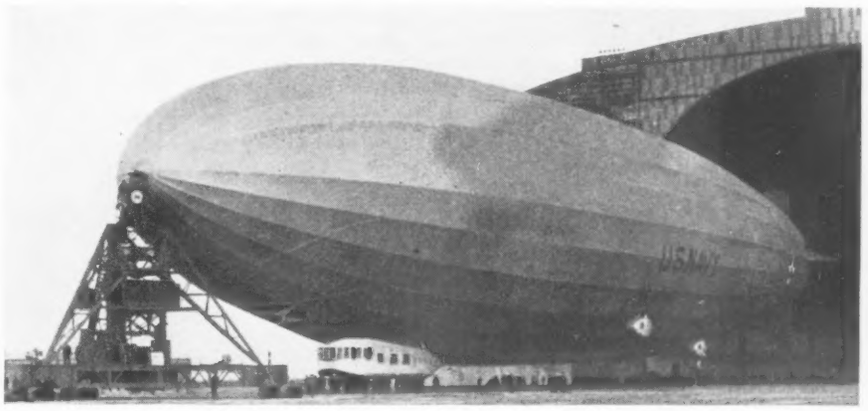
The value of the incentive payment system to Bethlehem has been justified by the results, the letter states, pointing to the fact that the corporation in 26 years has grown from a small specialty concern to the second largest steel company in the world; and that the administrative, selling and general expense of Bethlehem, including the bonuses, is less per ton of steel sold than that of United States Steel Corp. and the Youngstown Sheet & Tube Co.

Merger Appeal May Not Be Heard Before June

Youngstown, O.—Hearing on the appeal in the Bethlehem-Sheet & Tube merger suit may not be reached until June, according to Judge Louis D. Farr, of the circuit court of appeals. The hearing was set tentatively for March 19, but Judge Farr says the court will be busy throughout the district until May 22, when it will adjourn until June, and the merger case may not be reached on the docket before adjournment. Attorneys for Youngstown Sheet & Tube Co. have filed a petition in error, a formality in connection with the appeal.

Merger Opponents Seek To Amend Dividend Law

Columbus, O.—No action was taken by the judiciary committee of the house of representatives after its hearing March 4 on the proposed law revision to give minority stockholders who dissent to a merger the right to vote and draw dividends during subsequent legislation. The proposal is of direct interest to the dissenters to the Bethlehem-Sheet & Tube merger and Luther Day, their counsel, spoke in favor of the amendment.



—International Newsreel Photo

PORTABLE STEEL MOORING MAST HOLDS LOS ANGELES

Steel has been fabricated into the heavy portable mooring mast which leads the Los Angeles, giant dirigible, from her hangar in greater safety than a ground crew can give. The illustration shows the dirigible returning to Lakehurst, N. J., from Panama after naval maneuvers

February Steel Ingot Rate Is Highest in Five Months

DAILY rate of open-hearth and bessemer steel ingot production increased in February to 105,305 gross tons, the highest since September, 1930, according to the American Iron and Steel institute, New York. February's rate compared with 91,971 tons in January and 169,930 tons in February, 1930.

Relating production to capacity, February was a 52.60 per cent month, contrasted with 45.94 per cent in January and 38.57 per cent in December, which was the low month of the decline which set in the middle of 1930.

February's total of open-hearth and bessemer steel ingots was 2,527,318 gross tons, against 2,483,206 tons in January and 4,078,327 tons in February, 1930.

In the first two months of 1931 steel producers made 5,010,524 gross tons of ingots, against 7,874,417 tons in the corresponding period of 1930. The average daily rate from Jan. 1 to March 1 was 98,246 tons; a year ago it was 154,400 tons. The average of operations thus far in 1931 has been 49.07 per cent; a year ago it was 77.12 per cent.

The gain in the daily rate from 91,971 tons in January to 105,305 tons in February was one of 14.5 per cent. If March betters the February rate by 14.5 per cent the March rate will approximate 121,000 tons daily, which will make it the best month since June, 1930.

Barrel Shipment Slows

With a total daily productive capacity for combined I. C. C. and light barrels in January of 38,300 units, the percentage used was 27.2, according to report of members of the Steel Barrel Manufacturers' association, Cleveland. Of a total daily productive capacity of 40,400 units in December, the percentage used was 24.2.

Barrels shipped during January were 247,045 units, against December's 271,912 and November's 308,120 units. Total number of barrels on unfilled orders as of Jan. 1 was 589,671 units.

Range Boilers Increase

January production of range boilers was 54,772, compared with 33,299 in December and 54,121 in January, 1930. Unfilled orders, 30 days or less, were 10,744 in January compared with December's 16,410; unfilled orders for more than 30 days were 9510, down from December's 11,330. Shipments for January were 58,703 and at that figure were almost double December. Reports are by 13 manufacturers to the department of commerce, having a daily production capacity of 6960 boilers, the value of whose output is 80 per cent of the industry.

Steel Ingot Production—1930-1931

94.27 Per Cent of Industry Reporting
Gross Tons

1930	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	Number of working days	Approximate daily output all companies	Per cent of operation
Jan.	3,137,002	441,572	3,578,574	3,796,090	27	140,596	70.22
Feb.	3,336,021	508,618	3,844,639	4,078,327	24	169,930	84.88
2 mos.	6,473,023	950,190	7,423,213	7,874,417	51	154,400	77.12
Mar.	3,513,904	539,616	4,053,520	4,299,905	26	165,381	82.60
Apr.	3,406,610	509,234	3,915,844	4,153,860	26	159,764	79.80
May	3,265,190	528,968	3,794,158	4,024,778	27	149,066	74.45
June	2,835,527	407,586	3,243,113	3,440,239	25	137,610	68.73
July	2,411,592	353,723	2,765,315	2,933,399	26	112,823	56.35
Aug.	2,543,466	374,467	2,917,933	3,095,293	26	119,050	59.46
Sept.	2,273,668	429,975	2,703,643	2,867,978	26	110,307	55.10
Oct.	2,164,830	399,704	2,564,534	2,720,414	27	100,756	50.32
Nov.	1,806,109	300,337	2,106,446	2,234,482	25	89,379	44.64
Dec.	1,665,875	226,854	1,892,729	2,007,774	26	77,222	38.57
Total	32,359,794	5,020,654	37,380,448	39,652,539	311	127,500	63.68
1931							
Jan.	2,044,298	296,620	2,340,918	2,483,206	27	91,971	45.94
Feb.	2,085,529	296,974	2,382,503	2,527,318	24	105,305	52.60
2 mos.	4,129,827	593,594	4,723,421	5,010,524	51	98,246	49.07

Figures exclude crucible and electric ingots. Operating percentages for 1930 and 1931 are based on capacity of 62,265,670 tons as of Dec. 31, 1929.

Unfilled Tonnage Drops 4 Per Cent from January

In the first decline since September, unfilled tonnage of the United States Steel Corp. as of Feb. 28 was 3,965,194 tons, down 167,157 tons or 4.4 per cent. A year ago unfilled orders totaled 4,479,748 tons, or approximately 500,000 tons more than at present, as the following table shows:

1930			
Jan. 31	4,468,710	51,517+	1.20+
Feb. 28	4,479,748	11,038+	0.25+
Mar. 31	4,570,653	90,905+	2.03+
April 30	4,354,220	216,433—	4.73—
May 31	4,059,227	294,993—	6.78—
June 30	3,968,064	91,163—	2.24—
July 31	4,022,055	53,991+	1.36+
Aug. 31	3,580,204	441,851—	10.9 —
Sept. 30	3,424,338	155,866—	4.35—
Oct. 31	3,481,763	57,425+	1.68+
Nov. 30	3,639,636	157,873+	4.53+
Dec. 31	3,943,596	303,960+	8.35+
1931			
Jan. 31	4,132,351	188,755+	4.78+
Feb. 28	3,965,194	167,157—	4.04—

Steel Plate Orders Fail to Show Improvement

Total of new orders for fabricated steel plates fell to 23,275 tons in January, about 3500 tons under December, the low for 1930. Loss was largely confined to the oil storage tank classification. Monthly reports by 51 establishments to the department of commerce follow:

In Tons

1930	Total	Oil storage tanks	Blast furnaces	Miscellaneous
Jan.*	57,083	9,688	1,042	18,825
Feb.*	34,662	9,982	3,445	12,288
March*	46,137	9,195	2,749	22,610
April*	45,454	9,683	273	19,118
May*	38,328	10,495	426	16,479
June*	41,774	9,869	511	20,698
July*	38,283	11,969	102	17,752
Aug.*	36,513	10,056	750	21,910
Sept.*	41,066	14,916	514	18,301
Oct.*	30,197	4,518	231	18,665
Nov.*	33,151	9,965	179	14,632
Dec.*	26,787	5,118	135	13,227
(Yr.)*	469,435	115,454	10,357	214,505
1931				
Jan.	23,275	2,545	111	16,661

*Revised.

Steel Furniture Shipments and Orders Show Gain

New orders in January for steel furniture stock goods in the business

group totaled $1,798,140 and represented the highest aggregate since October. Shipments likewise were up. New orders for shelving improved in January, but shipments were under December's figures. Monthly statistics by report of makers to the department of commerce follow:

	Business Group		Shelving	
	New orders	Shipments	New orders	Shipments
	(In Dollars, 000 omitted)			
1930				
Jan.	2,886	2,890	724	674
Feb.	2,370	2,549	758	682
March	2,627	2,726	839	812
April	2,523	2,427	796	814
May	2,310	2,342	725	751
June	2,006	2,168	699	705
July	1,840	1,811	596	604
Aug.	1,788	1,985	526	555
Sept.	1,795	1,879	512	497
Oct.	1,855	1,901	534	593
Nov.	1,637	1,673	429	458
Dec.	1,565	1,800	242	468
(Year)	25,204	26,154	7,382	7,615
1931				
Jan.	1,798	1,797	376	393

Malleable Castings Output Again Is Encouraging

Malleable castings' production in January was 31,357 tons, the highest since June, 1930. Shipments and orders booked improved in January over December. Following comparisons are based on reports to the department of commerce from 115 establishments operating 129 plants:

	Output, tons	Shipments, tons	Orders booked, tons	Per cent operated
1930				
Jan.	61,381	57,820	58,009	61.6
Feb.	65,942	59,971	61,606	67.4
March	63,464	65,164	60,915	64.6
April	61,984	60,875	54,625	63.1
May	53,502	55,656	47,022	53.8
June	39,347	43,937	33,865	40.3
July	30,911	32,656	30,068	31.0
Aug.	25,614	31,845	25,409	26.2
Sept.	26,528	29,223	26,251	27.2
Oct.	28,785	29,206	24,171	29.0
Nov.	27,114	25,974	27,451	27.8
Dec.*	30,431	27,474	26,433	31.1
(Yr.)*	515,003	519,801	475,825	43.6
1931				
Jan.**	31,357	31,638	32,633	31.6

*Revised. **Preliminary.

Structural Steel Orders Reveal January Betterment

Fabricated structural steel bookings in January increased about 10,000 tons over the lows for 1930 in November and December. Shipments also were improved. As the number of manufacturers who report bookings and shipments to the department of commerce in the following comparison varies slightly from month to month, the department has assumed that orders and shipments for all plants in the United States amounts to the same percentage of total capacity as reported bookings and shipments are to the percentage of capacity of the reporting establishments. Revisions are to be noted in the following:

	Bookings		Shipments	
1930	Tonnage	Per cent capacity(1)	Tonnage	Per cent capacity(1)
Jan.*	238,800	59.7	229,600	57.4
Feb.*	267,600	66.9	280,400	70.1
Mar.*	236,800	59.2	264,800	66.2
April*	222,800	55.7	284,000	71.0
May*	279,200	69.8	265,200	66.3
June*	253,600	63.4	280,000	70.0
July*	270,000	67.5	274,800	68.7
Aug.*	252,000	63.0	262,400	65.6
Sept.*	155,600	38.9	243,200	60.8
Oct.*	209,200	52.3	239,200	59.8
Nov.*	151,200	37.8	195,200	48.8
Dec.*	152,800	38.2	168,400	42.1
Yr.*	2,689,600	56.0	2,987,200	62.2
1931				
Jan.	162,400	40.6	172,400	43.1

(1) Capacity: 1930, 400,000 tons.
*Revised.

«Radio City» To Require 125,000 Tons of Steel

New York—Construction of the $250,000,000 "radio city" development here by the Rockefeller interests is expected to start early in June. Builders' estimates of structural steel requirements for the group is 125,000 tons. There will be nine separate buildings on three blocks bounded by Fifth avenue and Sixth avenue from Forty-eight street to Fifty-first street. This will be the largest private development ever attempted in America, and probably the world. There will be 28,000 windows, and models of the "city" are now complete and on exhibition.

Towering over all other buildings in the group will be the building for the National Broadcasting Co., 68 stories, with 2,00,000 square feet of usable floor space, 150,000 more than the Empire State building. There will be two office buildings, 45 stories high, a tower for automobile parking, several theaters, an oval building, 14 stories high, and other structures.

James R. Todd, president of Todd-Robertson & Todd Engineering Corp., will be in charge of construction. Whether or not the new metropolitan opera house will be located in the "city" will be decided soon.

Financial News of Steel Industry

OTIS STEEL CO., Cleveland, reports net earnings after all charges including estimated taxes, of $868,729 in 1930. This compares with $3,687,690, equal to $3.41 a common share in 1929. Current assets were in the ratio of 6.1 to 1 to liabilities as of the close of 1930, compared with a ratio of 5.2 to 1 in 1929.

□ □ □

American Rolling Mill Co., Middletown, O., has omitted quarterly dividend of 50 cents due on the common stock at this time.

□ □ □

McKeesport Tin Plate Co., Pittsburgh, has declared usual extra dividend of 50 cents a share in addition to the regular quarterly disbursement of $1.

□ □ □

Ludlum Steel Co., Watervliet, N. Y., reports net loss of $433,697 after charges and depreciation for 1930, against net profit of $3.68 a common share in 1929.

□ □ □

Youngstown Sheet & Tube Co. Youngstown, O., has reduced annual dividend on common stock from $5 to $4 by declaring quarterly of $1 a share, payable April 1 to record March 14.

□ □ □

Republic Steel Corp., Youngstown, O., stockholders, will meet April 8 at Jersey City, N. J., for their annual meeting, at which time directors will be named. Stockholders of record March 9 will be entitled to vote.

□ □ □

Wheeling Steel Corp., Wheeling, W. Va., reports net for 1930 of $2,650,887 after depreciation, depletion and provision for taxes. Dividends paid totaled $4,042,181, reducing the surplus to $14,875,207 as of Dec. 31, 1930, from a surplus of $16,980,466 as of Jan. 1, 1930.

□ □ □

Midland Steel Products Co., Cleveland, has declared regular quarterly of $2 on 8 per cent cumulative first preferred stock, 50 cents on the $2 noncumulative dividend shares and 75 cents a share on the common. Dividends are payable April 1 to record March 23.

Burlington Steel Co. Buys Republic's Canadian Plant

Burlington Steel Co., Ltd., Hamilton, Ont., has bought the equipment, inventory and good will of the Canadian Metal Products Co., Guelph, Ont., a subsidiary of Steel & Tubes Inc., itself a subsidiary of the Republic Steel Corp., Youngstown, O.

Possession of the Canadian company passed to the Burlington company Feb. 28. The Guelph plant formerly received semifinished material from Cleveland and Youngstown, which it finished for the Canadian trade. It is said that the recent change in Canadian tariff, designed to strengthen the Canadian steel industry, prompted the sale.

H. W. Hinman, formerly manager of the Guelph plant, has joined the Burlington company in charge of its tubing division.

Industrial Men in the Day's News

Lewis B. Lindemuth, Vice President and General Manager, Marine Steel Corp.

BY the duplexing process, he perfected the use of high nickel, high chromium, Cuban iron ore for the then Pennsylvania Steel Co.

WHEN it was acquired by Bethlehem Steel, he went along and became superintendent of several departments, including heat treating.

HIS innovations include elimination of piping, segregation, elimination of blisters on steel sheets, etc.

RECENTLY organized by Clifford D. Mallory and associates, the Marine Steel Corp., New York, which is developing the use of corrosion-resistant alloy steels in marine applications, has appointed as its vice president and general manager, Lewis B. Lindemuth, consulting engineer.

Mr. Lindemuth has traveled in various parts of the world and has made his observations the basis for exacting applications. For instance, he is a department of commerce licensed airplane pilot and for several years has flown for diversion but always has kept the metal requirements of this new industry uppermost in mind.

Born in 1887 in Wichita, Kans., Mr. Lindemuth graduated from Penn State college in 1909. He entered the open-hearth and bessemer department of Pennsylvania Steel Co., Steelton, Pa., but continued post-graduate work at Penn State, receiving his master's degree in 1912. While at Steelton he developed the use of the company's Mayari iron ore from Cuba, which has high nickel and chromium content. By the duplexing process, i. e., bessemer converter blowing and open-hearth furnace refining, he produced high grade steel for automotive, structural and other industries.

In 1913 Mr. Lindemuth was made assistant superintendent of the Pennsylvania Steel Co.'s open-hearth and bessemer department, and when it was acquired by Bethlehem Steel Co. in 1917 he was ransferred to Bethlehem's Saucon works open-hearth department. He further perfected the duplexing process and then became superintendent of the crucible steel, electric furnace steel, electric steel foundry and tool steel treating departments.

Resigning in 1918, he and Frank D. Carney, who had just resigned from the Bethlehem company as chief metallurgist, organized as Carney & Lindemuth, New York, consulting engineers. Among Mr. Lindemuth's contributions to steel metallurgy are the elimination of piping, segregation, and the elimination of blisters on steel sheets. He also orginated the method of showing by means of graphs the physical properties of heat-treated steel and the proper heat treatment. He holds numerous patents some of which cover the use at present of manganese ore in open-hearth furnaces. He also improved rails and various other steel products for the railroads.

When Carney & Lindemuth dissolved in 1929 Mr. Lindemuth resumed his work as consultant, which he will continue, although most of his time will be devoted to the Marine Steel Corp.

E. M. VEHMEYER has been appointed manager of the Detroit plant and warehouse of Joseph T. Ryerson & Son Inc., Chicago. He succeeds W. H. Basse, who as noted in STEEL of Dec. 11, 1930, completed 30 years service with the Ryerson organization last Nov. 19. He has been manager at Detroit since July, 1918, and now has been transferred to Chicago to engage in special sales work.

Mr. Vehmeyer has been associated with the Ryerson company for more than 22 years, the major portion of that period having been spent in sales and service departments. For the last two years he has been sales manager at Detroit.

□ □ □

John May, for several years manager at New York of the electrical and wire rope department of American Steel & Wire Co., Cleveland and Chicago, has been transferred to Worcester, Mass., to become manager of sales of special products in the New England territory. This sales department has not been operating for 15 years.

□ □ □

R. A. Solborg was recently elected vice president of the Armco International Corp., subsidiary of American Rolling Mill Co., Middletown, O. He has been identified with the Armco organiation since June, 1916, when he became assistant export manager. In 1919 he was transferred to the company's New York office in the same capacity. In 1926 he was made district manager at Paris, France, where

he still is located, and shortly afterward was placed in executive charge of sales in continental Europe.

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J. C. Argetsinger has been appointed general counsel of the Youngstown Sheet & Tube Co., Youngstown, O., in succession to the late Leroy A. Manchester.

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George A. Long, formerly manager at Cleveland for Industrial Brownhoist Corp., has been appointed manager at Bay City, Mich., to succeed J. Stanley See, resigned.

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Dr. Bradley Stoughton, professor of metallurgy at Lehigh university, has been appointed consulting metallurgist of Standard Steel Works Co., Burnham, Pa.

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A. E. Weckerly, construction engineer of National Tube Co., Pittsburgh, has been appointed chief engineer at the Lorain, O., plant. He succeeds George T. Snyder, who was transferred to Pittsburgh in January.

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Clark P. Pond has been elected vice president in charge of engineering and sales of Truscon Steel Co., Youngstown, O. He formerly was connected in a similar capacity with David Lupton's Sons Co., Philadelphia.

□ □ □

J. H. Baily has been elected a vice president of Edgewater Steel Co., Pittsburgh. D. W. McGeorge has been elected secretary. Other officers are: F. B. Bell, president, William V. D. Wright, vice president, and W. F. Carey, treasurer.

□ □ □

Lloyd Booth, member of the Booth family which aided in founding United Engineering & Foundry Co., Pittsburgh, has been appointed special sales representative for the United company in the Youngstown, O., district. He formerly was with Trumbull Steel Co., Warren, O., and later president and treasurer of Falcon Steel Co., Niles, O.

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A. F. Steen, furnace engineer in charge of heat treating equipment in the tractor works, International Harvester Co., Chicago, for more than eight years, has become affiliated with Chicago Steel Foundry Co., Chicago, manufacturer of heat and abrasion resisting alloys. He will have charge of the service department, furnace engineering.

Walter J. Hansen, sales engineer, who for nine years has been associated with Electroalloys Co., Elyria, O., now will represent the Chicago Steel Foundry Co. at Syracuse, N. Y., in the sale of its alloys.

□ □ □

J. N. Jones, superintendent of the blooming mill and rod mill of Gulf States Steel Co., Birmingham, Ala., has also been made superintendent of the company's new plate mill at the Alabama City, Ala., works. He has been with the company for 20 years.

E. M. Barnes has been appointed manager of pig iron sales of the Gulf States Steel Co.

□ □ □

Harold B. Reid, formerly purchasing agent for Wallace Barnes Co., Bristol, Conn., manufacturer of screw machine products, springs, wire, etc., has been elected vice president and appointed general sales manager to succeed the late Brown Joyce, whose death was notd in STEEL of March 5.

Harry C. Barnes, the company's treasurer, is now purchasing agent as well.

□ □ □

George V. Sevald, who since 1927 has been manager of western sales and more lately manager of eastern territory as well for Thompson Products Corp., Cleveland, subsidiary of Thompson Products Inc., has been promoted to be sales manager of the Cleveland equipment division. For 16 years he has been closely associated with automotive engineers improving motor parts and now will supervise the marketing of the company's line of valves, bolts, pins, etc. He began with the company in 1916 as a salesman.

E. M. Vehmeyer

□ □ □

Joseph F. Heil was recently elected vice president and director of the Heil Co., Milwaukee, manufacturer of hydraulic hoists, tanks, welded steel motor truck bodies, etc. He is the son of Julius P. Heil, founder and president of the company, and also is treasurer of the Milwaukee Air Power Pump Co. and Combustion Oil Burner Co. divisions of the Heil Co.

Bert W. Fueger was elected vice president of these divisions, and Herman W. Falk, president of Falk Corp., was elected a director.

Obituaries

FRANK K. HOOVER, 77, head of Hoover & Mason Co., Chicago, contracting enginneer for ore docks, conveying machinery, etc., died March 6. He was born in North Canton, O., and moved to Kansas City, Mo., in 1879 to engage in the wholesale agricultural implement business. He later became president of Kansas City Edison Co. In 1894 he and Arthur J. Mason formed the civil engineering firm of Hoover & Mason, which business was removed to Chicago in 1902. Mr. Hoover conducted it alone after the withdrawal of Mr. Mason in 1910, constructing ore docks and conveying machinery at Ashtabula and Youngstown, O., South Chicago, Ill., Sparrows Point, Md., and elsewhere. Mr. Hoover also was president of Hoover & Mason Phosphate Co., Chicago and Mt. Pleasant, Tenn., director of Hoover Co., North Canton, O., American Sintering Co., Ruhm Phosphate & Chemical Co., and Phelps Stone & Supply Co.

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William Zolg, 54, secretary-treasurer and director, Toledo Scale Co., Toledo, O., died recently.

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Amos J. Mitchell, vice president of the M. & V. Tank Co., Wichita Falls, Tex., died recently in an automobile accident.

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Rodney D. Briggs, founder of Briggs Mfg. Co., Detroit, metal stampings, automobile bodies, etc., died March 5 at St. Petersburg, Fla.

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John H. Yardley, an executive of the Southern Car Wheel Co., Philadelphia, until he retired in 1927, died there recently. He founded the Philadelphia Car Wheel Co. in 1892, and when it was merged with the National Car Wheel Co., he was vice president. This company was sold in 1924 to the Southern Car Wheel Co.

□ □ □

Herbert B. Jones, 47, who was president of Steel City Sheet & Tin Plate Co., former jobber of Pittsburgh, but who resigned recently to engage in the real estate business, died March 4. For 20 years prior to the organization of his company Mr. Jones had been identified with Follansbee Bros. Co., Pittsburgh and Follansbee, W. Va.

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David A. Ebinger, 75, president, treasurer and founder of the D. A. Ebinger Mfg. Co., Columbus, O., died recently at Fort Myers, Fla. He was president of Columbus Heating & Ventilating Co., Columbus, until 1910, when he resigned to form the D. A. Ebinger Sanitary Mfg. Co., of which he was president and treasurer until his death.

Here and There in Industry

AMERICAN STEEL & WIRE Co. will establish in Worcester, Mass., a sales office to cover New England territory for special products of the mills of the Worcester district, which includes besides the three plants at Worcester, the mills at New Haven, Conn., and Trenton, N. J. These special products include electrical wires and cables, rail bonds and wire rope. The office will be in charge of John May, who has been manager of sales of the electrical and wire rope departments of the New York office.

Mr. May has been appointed assistant general manager of sales under D. A. Merriman, vice-president and general manager of sales. Mr. May will have as his assistants in the Worcester office F. Kenneth Sawyer, now covering sales in Worcester, and Hugo D. Scott, formerly of Worcester, who has been transferred from the Boston office. Fifteen years ago the Worcester sales office was abandoned. The new office will be reopened April 1.

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Leipsic Trade Fair Inc., Leipsic, Germany, has moved its New York offices from 11 West Forty-second street to 10 East Fortieth street.

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Union Machine Co., Bartlesville, Okla., manufacturer of oil field equipment, has increased its capital to $250,000.00.

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Bell & Eiss Inc., 430 Oak Grove avenue, Minneapolis, has been appointed representative in territory adjacent to the Twin Cities for the Edward Valve & Mfg. Co., East Chicago, Ind.

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National Tube Co., Pittsburgh, has moved its Tulsa, Okla., field engineering office from the Exchange National Bank building to 1205 Philtower building.

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Canadian Westinghouse Co., Hamilton, Ont., has installed four unusually large waterwheels at the plant of the Alcoa Power Co. at Chute-a-Canon, Quebec. Each develops 77,000 horsepower.

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Reid Bros., Bellingham, Wash., owners of Reid Boiler Works, Tenth street and Douglas avenue, have bought the Burpee Iron Works, 614 Harris avenue, and have incorporated the Bellingham Iron Works to operate the acquired plant.

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Evans Auto Loading Co. Inc., New York, has changed its name to Evans Products Co. The change is made because the company has entered the manufacturing field, producing battery plate separators and wood block flooring. E. S. Evans is president.

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Diamond Machine Co., Providence, R. I., has appointed the Cleveland Duplex Machinery Co., Cleveland, its exclusive representative in that area. It will handle sale of grinding and polishing machinery, including hydraulic drive face and surface grinding machines.

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Ingot Iron Railway Products Co., Middletown, O., has opened a branch office at 509 Forsyth building, Atlanta, Ga., in charge of E. T. Cross, formerly stationed at Denver, Colo. The office will cover sales in Georgia, Alabama, Tennessee and the Carolinas.

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Duriron Co. Inc., Dayton, O., has established a branch office at room 528 Leader building, East Sixth street and Superior avenue, Cleveland, in charge of E. D. Brauns. The office will be devoted to sale and service of alloys made by this company.

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Conco Crane & Engineering Works division of H. D. Conkey & Co., Mendota, Ill., has appointed C. P. Maxson, Auditorium Garage building, Cleveland, its representative for that territory and Starr-Carpenter, Parks building, Pittsburgh, for the Pittsburgh district.

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Julin Combination Windows Inc., Jamestown, N. Y., has been formed to manufacture steel and hollow metal window frames, storm windows, porch screens and other metal products of similar form. The company is composed of John Rockman, Karl J. Julin, Clarence E. Julin and Harvey M. Parker.

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Stevens-Walden Inc., wrench manufacturer, Worcester, Mass., has reelected officers, as follows: President and treasurer, H. W. Bleckley; vice-president, George W. Fleming; clerk, George H. Mirick; directors, Clarence C. Dodge, Frank J. Weschler, George W. Fleming, H. W. Bleckley and H. P. Adams.

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Erie Meter Systems, Erie, Pa., manufacturer of filling station equipment, is establishing a branch manufacturing plant at Tulsa, Okla., having acquired the plant of Paul Arbon & Co. at Tulsa for assembly and distribution purposes. R. A. Newcomb will be general superintendent of the Tulsa plant.

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Watson-Stillman Co., Roselle, N. J., has bought the assets and business of the Burroughs Co., Newark, N. J., which for many years has specialized in design and building of plastic molding hydraulic machinery, including tilting head presses, rodless hubbing presses and celluloid working machinery. The Watson-Stillman Co. will continue manufacture of this line in addition to its own.

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Electric Household Utilities Corp., formerly Hurley Machine Co., Chicago, now is manufacturing ironers and washing machines for General Electric Co. The latter has been gradually increasing its holdings of Electric Household stock, and now owns 33 1/3 per cent of the outstanding stock, or in excess of 136,000 shares on the basis of number of shares outstanding Dec. 31, 1929.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has received from the Electro Metallurgical Co., New York, an order amounting to approximately $100,000 for six transformers to supply power to electric furnaces. These will be part of the equipment for one of the largest electric metallurgical plants in the world, to be built at Boncar, W. Va. The Electro Metallurgical Co. is subsidiary of the Union Carbide & Carbon Corp.

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Baldwin-Duckworth Chain Corp., Springfield and Worcester, Mass., has elected George H. Empsall, Springfield, president, and Frank J. Weschler, Worcester, vice president and treasurer. Other officers include: Vice presidents, William F. Cole, Worcester, and William E. Gilbert, Springfield; clerk, George A. Gaskill, Worcester; directors, Edward K. Allen, Harold G. Duckworth, George H. Empsall, George D. Gilbert, William E. Gilbert and George M. Hendee, Springfield, Henry P. Blumenauer, William F. Cole, George T. Dewey, George A. Gaskill, William H. Gates and Frank J. Weschler, Worcester.

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Monighan Mfg. Co., 931 North Kilpatrick avenue, Chicago, the controlling interest in which recently was purchased by the Bucyrus-Erie Co., South Milwaukee, Wis., has changed its name to Bucyrus-Monighan Corp. Four officers and directors of the Bucyrus-Erie Co. have been elected to the Monighan division board, as follows: W. W. Coleman, president; G. A. Morison and Edmund K. Swigart, vice presidents, and W. M. Bager, director. Mr. Coleman has been elected chairman and Mr. Morison vice chairman of the Bucyrus-Monighan Corp.

Wesley Bowman Studio

Steel Angles from Chicago

CHICAGO

MIDWEST economic affairs have become tangled with the weather and, as usual, the weather seems to be winning. That is, much opinion in the industry blames the balmy, arid winter for the uncertain farm equipment prospects, poor railroad orders, the slow pickup in building, shriveled rail earnings and whatnot.

The scent of spring is not yet in the air, and until more settled weather and better crop prospects seem something of a more seasonal guarantee the outlook is not expected to change materially. Lack of moisture in the winter wheat belt again has upset assembly line schedules in the Midwest implement works. Not until well into second quarter, in the opinion of many, will steel buying get into a healthy swing.

It is probable that to no single influence can be ascribed the responsibility for the straggling return of profitable operations. Belief prevails that the steel industry in the West would feel a powerful stimulus if the railroads soon were to map out car equipment programs. With western revenue freight loadings approximately 20 per cent under what is viewed even as normal, prospects are dull for at least about seven months.

Car Builders See Little Business Before Autumn

The large western car building capacity that now stands virtually idle probably will see no change before early autumn. The shops generally are resigned to that eventuality, without giving vent to undue pessimism. Several car shops are on repair parts.

General American Tank Car Corp. works in this district is on short turns for its leasing equipment and special tank cars. A few rail-motor cars are being built, and an Iowa car foundry is assembling an order of underframes for a packing concern.

During January and February, 1930, steel producers booked more than 200,000 tons of finished steel for about 20,000 cars ordered in the 60-day period. In the first two months of this year, steel requirements were confined almost exclusively to repair and remodeling work, and even this has been discouragingly small.

Jobbing foundries in the Chicago area have seen a more active flow of castings orders in recent weeks while rolled steel producers are seeking to build up backlogs despite the expansive gap of car equipment work that in recent years has formed in January and February the core for a lush season.

Locomotives Doing Four Times Former Tasks

Locomotive orders last month numbered eight, and two orders were placed in January. Sixteen were ordered in February, last year. No passenger rolling stock was purchased in January or February of this year. The greater service obtained by the carriers with new motive power seems to preclude early locomotive buying.

Motive equipment now hauls 18-car trains with less servicing than when engines pulled 12 to 14-car trains. Single runs of 925 miles per locomotive are more common. An ore-carrying road is making 12 locomotives now do the work of more than twice that number before. One transportation setup has 40 locomotives performing in service what would have been regarded in former years quadruple results.

◆

Several more implement works are building up operating schedules and releasing orders to the steelworks and foundries, but the gains are slow and consumption the lightest in five years. At present they are turning out more sentiment than tools. Two of the John Deere & Co. plants, one at East Moline, Ill., and the other at Waterloo, Iowa, are at capacity turning out tractors to replenish run-down dealer stocks. International Harvester Co.'s plants are going better, averaging three to five days. Oliver Farm Equipment Co. still is turning out tractors for Russia, and is doing little on tillage tools

Large stocks have plagued the implement companies, but not to the extent of 1921. Several of the concerns that have been in disconcerting predicament are pulling out in good form. Gleaner Combine Harvester Corp., Independence, Mo., which has accomplished important research and development work in recent years, has met with troubles, due to tax claims, unreceipted bills and heavy stocks, and is being operated under a tripartite receivership. A former implement man is operating receiver.

Implement Maker Gets Back on Its Former Basis

Resuming as before the receivership proceedings, activity is approaching more normal status, a stockholders' protective committee is functioning, and possibilities are that this company, like Oliver Farm Equipment Co. will work soon toward satisfactory readjustment. Oliver, which recently called C. R. Messinger, Chain Belt Co. Milwaukee, to its presidency, also has further strengthened its executive staff with Myron E. Forbes, a former automotive and implement executive, as vice president in charge of financial affairs.

Trainloads of implements have started their annual spring trek southwestward for the earlier season there, but not in the volume of recent years.

(*Concluded on Page* 74)

EDITORIAL

What Should I Do About Unemployment Insurance?

CONGRESS has adjourned without taking action on proposals to put it on record as favoring unemployment insurance. The Pennsylvania legislature has tabled a bill providing for unemployment insurance. Ohio and some other states still are wrestling with the problem, with the probability that in at least the majority of them such bills will not be passed. In the five years preceding the present legislative sessions 18 bills were proposed in as many assemblies and voted down.

State unemployment insurance has not become a threatening issue, despite the fact that "reds" or "pinks" appear to be the real sponsors. The American Federation of Labor at its 1930 convention referred to its executive committee a resolution favoring unemployment insurance, an action considered by many of the members as equivalent to shelving it, as President Green has expressed skepticism as to the desirability of such plans. A few affiliated unions have published in their journals tentative drafts of insurance laws; but organized labor as a whole has not pressed the issue half so persistently as the communist groups.

The main purpose of the communists is not to insure the stability of labor, but to wreck private industry, and to prove that government as we have it in this country is incapable of solving an important social problem. When some of the bills came up for hearing the chief advocates were radical organizations.

Two Types of Plans; Less Than 1 Per Cent of Wage Earners «Covered»

Nevertheless, a number of industrial companies recently have adopted insurance plans to be financed wholly by themselves or in conjunction with contributions from employes. Fourteen Rochester, N. Y., manufacturing companies have agreed jointly to set aside funds to pay employes "benefits" during periods of unemployment. In this instance the employes do not contribute to the funds, while in another outstanding example, that of the General Electric Co., employes' contributions are matched equally by the company.

Many managers are in a quandary today as to what to do about unemployment insurance. They must consider the fact that there are not more than 100 instances of such plans now in operation; that the number of employes "covered" does not amount to more than 1 per cent of the total 23,000,000 wage earners. All such plans still are in an experimental stage. Insurance companies are not permitted by law to assume such risks.

The theory of insurance is this: The employe has a continuing interest in the business, the same as capital, which interest does not cease when there is a temporary lull in demand for his active service; that as management sets aside a surplus to pay dividends in bad times, so it also should provide a surplus for labor.

More Responsibility for Management; Keeping Regular Force at Minimum

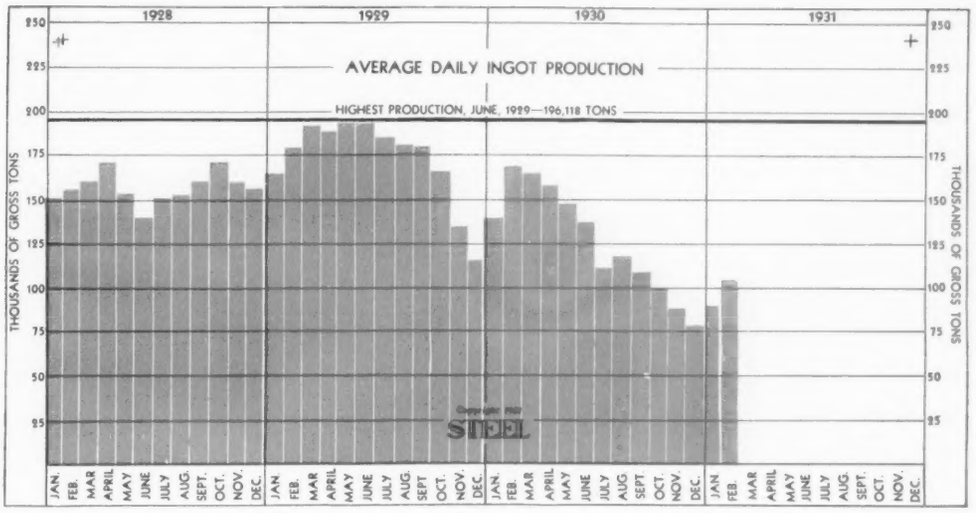
This thrusts a new responsibility onto management, the necessity for paying idle men at a time when business is least profitable. It has a broader significance to the wage earner. If an employer guarantees to pay a sum of money at weekly intervals at such times when he cannot use his service the employer will be very careful not to engage any more workers than he can expect to pay in an emergency. This means higher standards will be exacted of those who are engaged. The inexperienced and the inefficient will find it more difficult to obtain positions, except in the most prosperous times.

Naturally, the employer would keep his labor force at a minimum. Development of labor saving devices, the cause of technological unemployment, would receive fresh impetus. Failure of private insurance plans for lack of funds and a serious unemployment situation would build up sentiment for compulsory insurance.

It is to be hoped that employers will not be stampeded into adopting hastily-conceived insurance plans, a potential source of future trouble. The fear of state insurance is allayed for the present. If some successful form of private, contributory insurance can be worked out, whereby the employe will not feel that something is being withheld from him today to provide for an indefinite future payment in which he might not share, the danger of state insurance would be further removed. The employe must be made to understand his own responsibility as well as that of the responsibility of management; otherwise whatever he receives will partake of the nature of a "dole."

Industry has not yet reached the limit of its resources for stabilizing employment, and the thought of insurance should not swerve it from that purpose.

THE BUSINESS TREND



1930

	Tons
Feb.	169,930
Jan.	140,596

1929

Dec.	116,120
Nov.	135,116
Oct.	167,098
Sept.	181,119
Aug.	182,491
July	186,561

1931

	Tons
Feb.	105,305
Jan.	91,971

1930

Dec.	77,222
Nov.	89,379
Oct.	100,756
Sept.	110,307
Aug.	119,050
July	112,823

Improvement in Steel Clearer Than in General Business

CROSS-CURRENTS prevent any positive identification of a marked forward course in general business channels, but those portions of industry involving iron and steel exhibit more definite signs of slow, deliberate improvement.

Statistics for February steel production disclose the fact that with a daily rate of 105,305 tons of steel ingots, steelworks have made a healthy gain in rate of operation. In fact, the past month witnessed the recovery of about all the ground lost during the final quarter of 1930. February's rate is close to that of last September. The American Iron and Steel institute places the rate of operations at 52.6 per cent of capacity for February, and during the first week of the present month operations were estimated at 55 per cent, indicating that the modest week-by-week advance still is being made.

In company with ingot production, pig iron output was stepped up in February, and as a net gain of seven stacks was registered, daily average production reached 61,112 tons. Was the advance in iron and steel more than seasonal? Steel ingot output was about 14.5 above that of January, and pig iron output was about 10.4 per cent higher. Were these increases greater than the usual seasonal increase, in terms of percentage?

Steel and Iron Rise Is Above Average

The following table, prepared from steel statistics by the American Iron and Steel institute and pig iron statistics by STEEL, shows what happened in the last five years, and how this year's gain compares with the trend for that period and with an average for the last ten years.

Per cent of Gain in February Daily Rate Over January

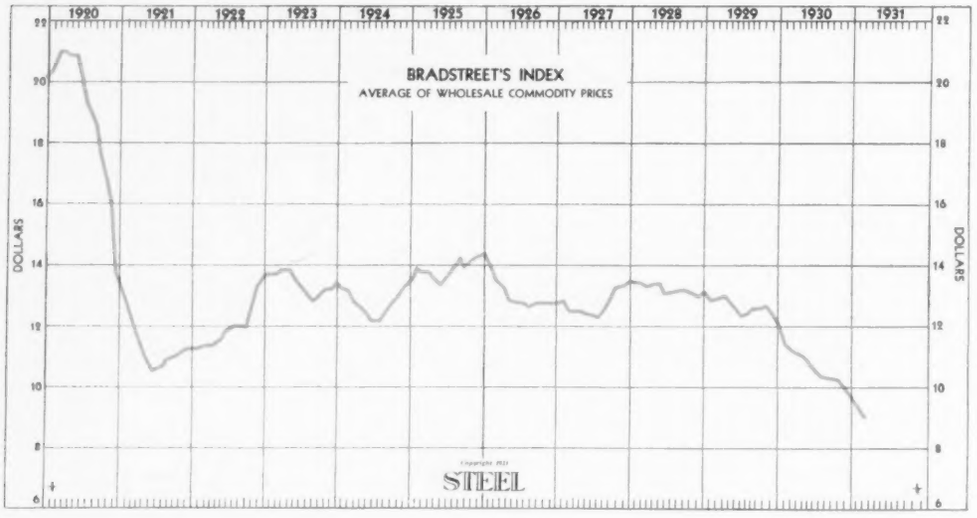
	Pig iron	Steel ingots
1926	—2.5	—0.8
1927	5.0	8.9
1928	8.5	5.4
1929	3.8	8.2
1930	10.9	20.8
Five-year average, 1926-1930	5.14	8.50
Ten-year average, 1921-1930	4.09	6.13
1931	10.40	14.50

Pig iron, with an average February gain of a little over 4 per cent, and steel, with an average February gain of 6.13 per cent, in all appearances went up more than seasonally last month. It will be noted that in 1930 February's rise was also well above the average shown.

Structural Steel Most Active Line

Building construction, not particularly strong for some time, during the past two weeks showed signs of betterment. Awards for structural steel increased, more noticeably in the metropolitan New York area, and inquiries are heavier in the Middle West. Railroads continue to buy conservatively, but releases for track material are appearing at a little better rate. Car building remains at a low ebb. The automotive industry, although producing considerably fewer cars than last year at this time, still is expanding gradually its schedules, and sheets and parts are being taken at better rates.

Commercial failures were unusually heavy again in February. Varied reports are made concerning retail trade. Commodity prices continue downward, Bradstreet's index showing a decline of 1.5 per cent during the month.



	1931	1930
March 1	$9.17	$11.22
Feb. 1	9.31	11.51
Jan. 1	9.51	11.68

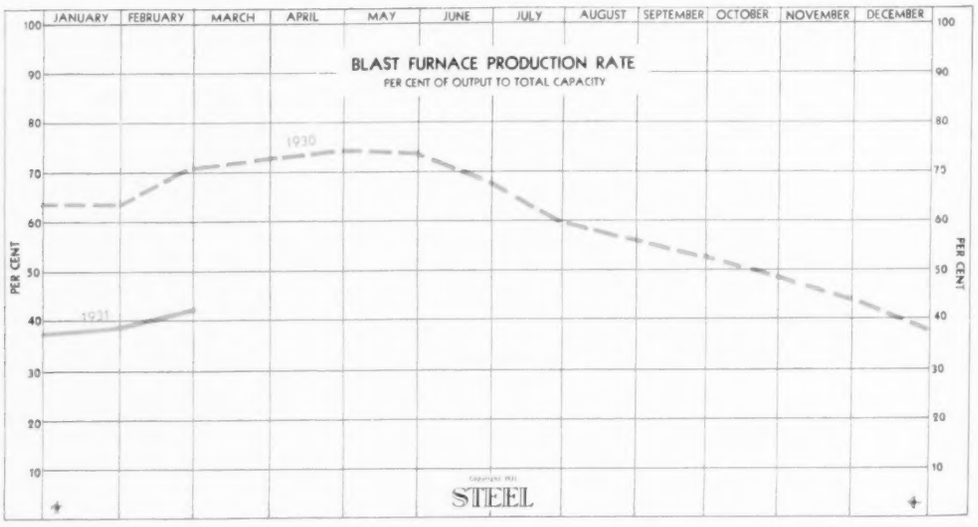
	1930	1929
Dec. 1	9.84	12.23
Nov. 1	10.06	12.40

Downward Trend of Commodity Prices Is Prolonged in February

The decline in wholesale commodity prices during February amounted to about 1.5 per cent, as shown by Bradstreet's index, which on March 1 stood at $9.17. Since the same date a year ago, the price decrease has been 18.3 per cent. In an unbroken line, the index has dropped 17 times. A comparison with the depression of 1920-1921 shows that while the cut in prices has not been so severe, it has lasted longer. During the 16 months beginning March, 1920, there were 15 downward steps, interrupted by a slight increase on one occasion, before the index started to climb in July, 1921. Of the 13 groups represented, seven went downward and six upward in February.

Further Gain in Active Stacks Boosts Furnace Operations

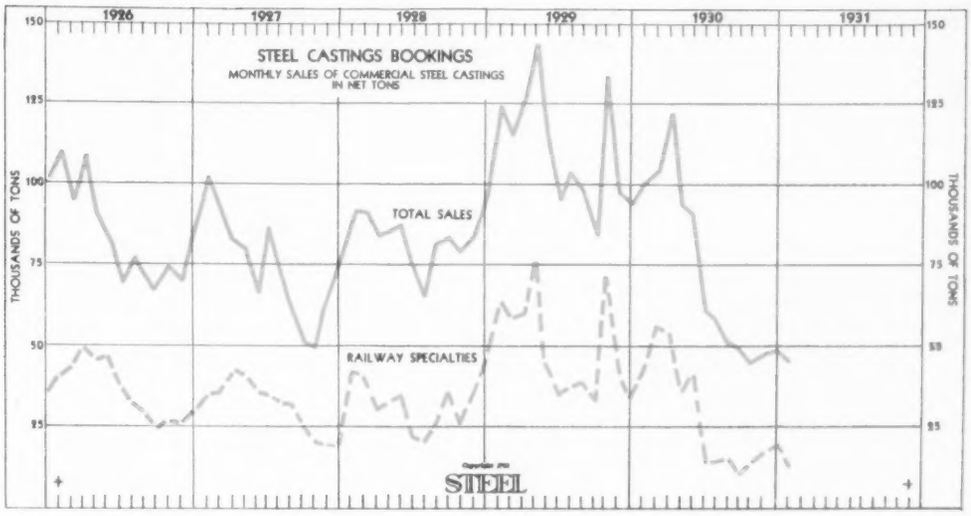
February blast furnace operations, at 43.3 per cent of capacity, were the best since November, and were practically equal to that month. A gain of slightly more than four points was made over January. In February, 1930, the industry was at 72.1 per cent of capacity. The first two months of 1931 each contributed seven to the total of stacks in operation. Furnaces in blast at the end of February were 109, compared with 102 at the end of January and 95 at the end of December. Whereas January's net gain consisted of one merchant and six non-merchant stacks, there was no change in merchant stacks in February, the net gain being entirely at steelworks.



Per Cent

	1931	1930
Feb.	43.3	72.1
Jan.	39.2	65.0

	1930	1929
Dec.	38.1	65.5
Nov.	44.1	75.8
Oct.	49.6	82.6
Sept.	53.8	83.3
Aug.	57.8	86.4



Total New Bookings

	Tons
January, 1931	46,631
December, 1930	49,387
January, 1930	101,500

Railway Specialties

January, 1931	14,718
December, 1930	19,256
January, 1930	42,502

Bookings of Steel Castings Lag in January

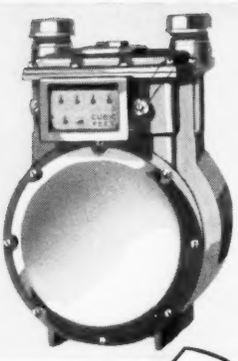
While orders for railway specialties and total steel castings suffered a relapse in January the decrease in railway specialties was sufficient to permit miscellaneous commercial steel castings to experience a small rise without causing the total to gain. Total orders were for 46,631 tons, down 2756 tons from December. Railway specialties were booked in the amount of 14,718 tons, a decrease of 4538 tons. Orders for miscellaneous castings, comprising the remainder, were for 31,913 tons, compared with 30,131 tons in the previous period. Production figures in each class followed the same trend as orders, except that the miscellaneous group expanded slightly more, and production in this class was a little above orders.

Orders for Structural Steel Climb Slowly Upward

Structural steel fabricators in January booked orders which amounted to a slight increase over December. Bookings were 162,400 tons, and the industry was at 40.6 per cent of capacity. December, with 152,800 tons, in turn held a slight margin over November, when 151,200 tons were booked. In January a year ago orders were for 238,800 tons, and the rate was 59.7 per cent. Two years ago the industry was at 66.5 per cent of capacity. Shipments in January made their first increase since last June, amounting to 172,400 tons compared with 168,400 tons in the previous period. In January a year ago 229,600 tons were shipped. At no time since May, 1930, have orders exceeded shipments.

	Tons	
	1931	**1930**
January	162,400	238,800
	1930	**1929**
December	152,800	297,605
November	151,200	212,135
October	209,200	319,550
September	155,600	297,990

The cover of the meter here shown, at one time was a heavy, bulky part. Grinding, drilling, mounting and breakage costs were too high. Redesigning the cover in pressed steel saved these costs as well as 10% of the first cost of the part.



Pressed Steel
Cuts the Waste from Production Dollars

OUT in *your* factory does "overhead" include such items as breakage of parts, refitting, machining, excessive handling costs?

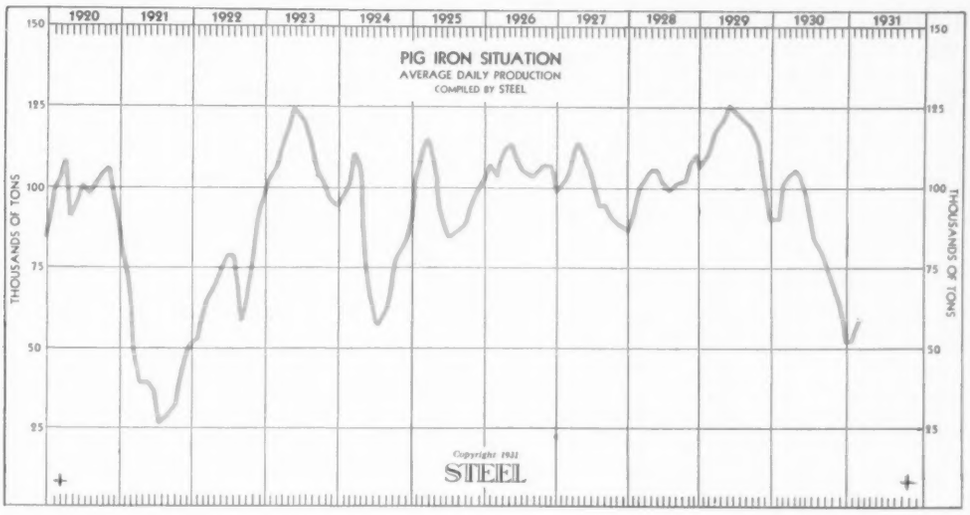
Many alert manufacturers have practically eliminated such losses with pressed steel.

If heavy, bulky parts burden your product, call in the Pressed Steel Redesign Engineer. His research, which costs you nothing, will reveal how you, too, can enjoy increased profits in the modern pressed steel way.

Let us send you concrete evidence of how pressed steel has almost revolutionized obsolete and costly manufacturing methods. It may be the means of saving you thousands of dollars. Write today. Trade Research Division, National Association of Flat Rolled Steel Manufacturers. 511 Terminal Tower, Cleveland, Ohio.

Save Money Labor Time Weight with Pressed Steel

	1931	1930
Feb.	61,112	101,640
Jan.	55,337	91,573
	1930	**1929**
Dec.	53,732	91,513
Nov.	62,182	106,081
Oct.	69,851	115,747
Sept.	75,893	116,548

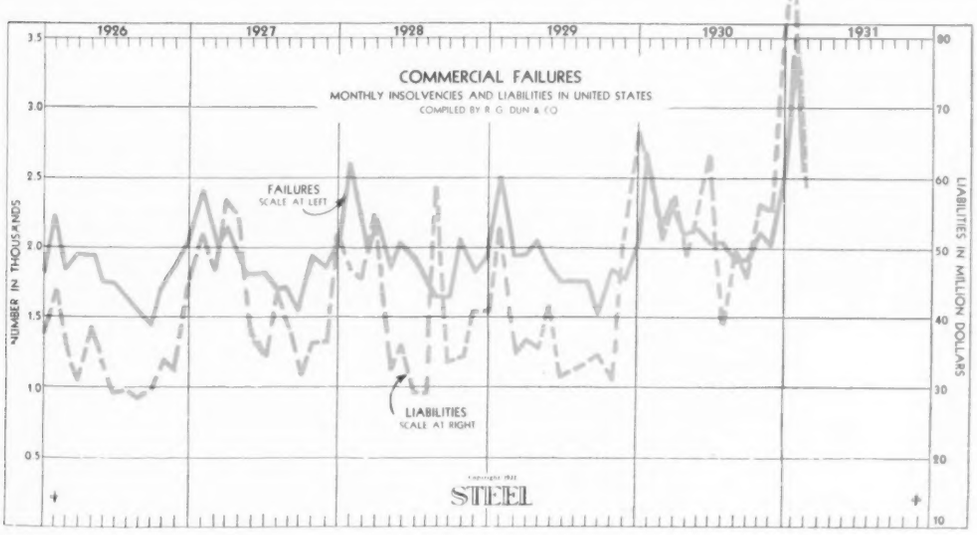


Pig Iron Output in February Makes Second Consecutive Monthly Gain

Again in February the output of pig iron improved, February daily average production being 61,112 tons compared with 55,337 tons in January. The increase is the second since December's daily average of 53,732 tons. The gain during the past month amounted to about 10.4 per cent, which was at least a seasonal increase. In 1930 production went from 91,573 tons in January to 101,640 tons in February, which was a slightly better ratio, but in the two previous years smaller gains were established in terms of percentage. Total production for February, 1,711,137 tons, is divided into 1,375,052 tons of nonmerchant iron and 336,085 tons of merchant iron, the gain being attributed to nonmerchant stacks.

Failures Decline, But Set Record for Month of February

Although commercial failures declined considerably from the high point of January, nevertheless in numbers they set a new record for the month of February. R. G. Dun & Co. report 2563 defaults, involving $59,607,612. The previous high record for February was in 1922, when 2331 commercial firms failed. Liabilities dropped 37 per cent from the previous month, but were 16 per cent above a year ago. The number of failures previously had been above 2000 in the month of February only in 1915, 1922, 1927, 1928 and 1930. While there were 13 per cent more defaults in February than a year ago, the rate of gain over last year decreased during the month as January figures had been 20 per cent above January, 1930.



Liabilities

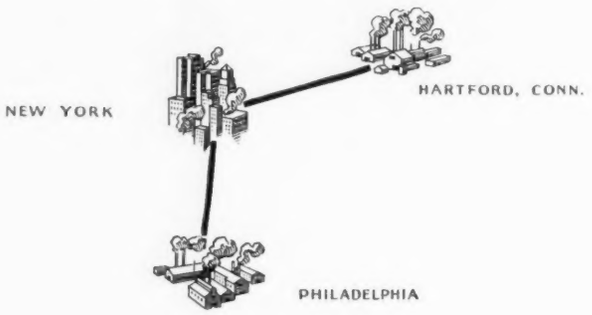
Feb., 1931	$59,607,612
Jan., 1931	94,608,212
Feb., 1931	51,330,000

Number

Feb., 1931	2,563
Jan., 1931	3,316
Feb., 1930	2,262

FOR SEVEN YEARS SKF INDUSTRIES, INC., HAVE CONTROLLED THE OPERATION OF THEIR SEPARATED PLANTS BY

TELETYPEWRITER SERVICE



THE dependability of Teletypewriter Service* is emphasized in the case of SKF Industries, Inc., where it has been used for seven years to connect the New York headquarters with two plants in Philadelphia and one in Hartford.

"Frankly, we put the service in originally with our fingers crossed," says the Secretary and Treasurer. "We were skeptical about what it would accomplish. But we soon found we could not get along without it. My associates are all engineers—pretty critical men. If anything were wrong with the service, they would let me know about it very quickly. But there is not one of them who would want to do without it, it is so valuable to us."

Teletypewriter Service is used by SKF Industries largely for transmission of highly technical information, involving many figures. Its speed and accuracy make it possible to deliver many orders the same day they are received. About 500 messages are sent and received each day between the three points, relating to credit—sales—engineering—production—purchasing—accounting—and administrative matters.

Teletypewriters save much more than their cost in speeding various operations. Your local Bell Company will gladly give you full information about this modern method of business communication.

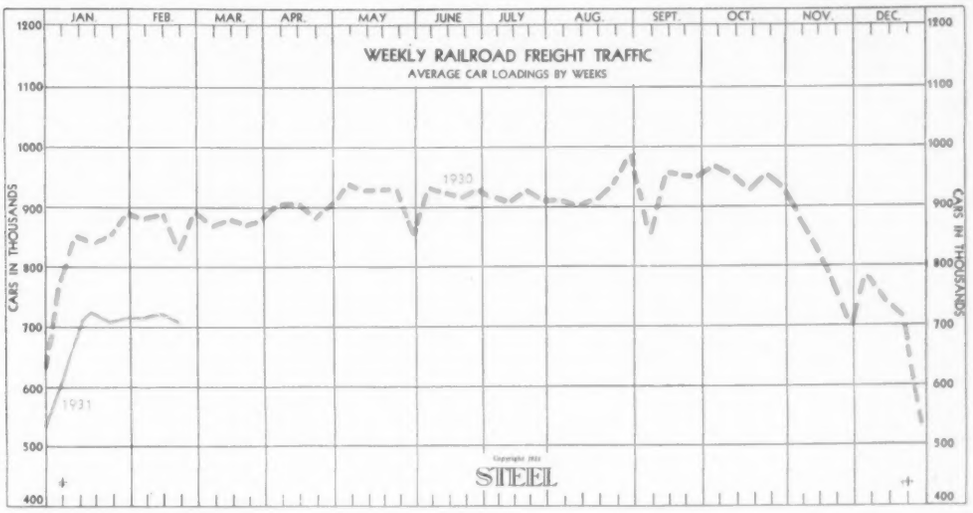
* * *

**Teletypewriter Service brings separated units of a company "under one roof," whether they are 300 feet or 3000 miles apart. A message typed on one Teletypewriter is identically reproduced at the same moment on all connected machines.*

1. *SKF official in New York Office hands important message to his secretary*

2. *Message is delivered to Teletypewriter operator, who types it immediately*

3. *At the same moment, it is automatically reproduced in Hartford Office*



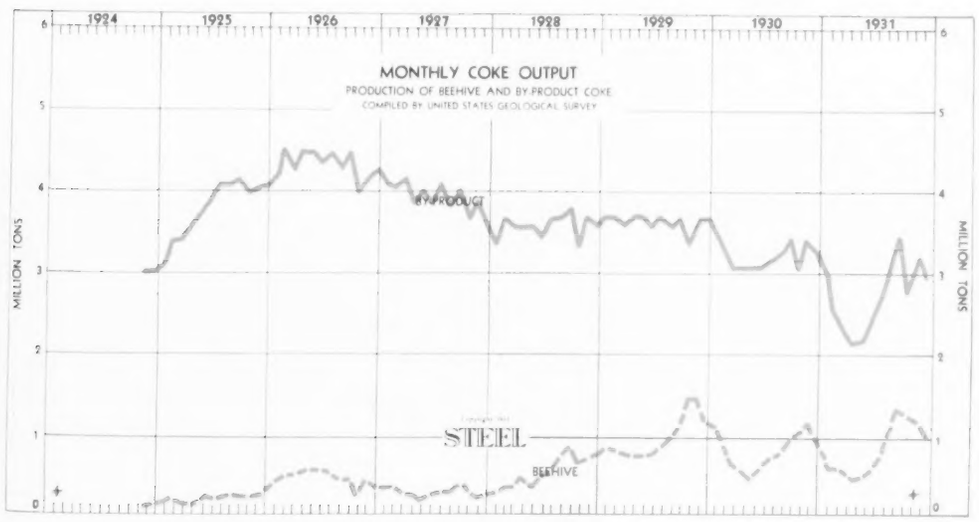
	1931	1930
Feb. 21	713,938	827,560
Feb. 14	720,689	893,140
Feb. 7	719,053	885,816
Jan. 31	719,281	898,835
Jan. 24	715,690	862,346

Freight Car Loadings Drop Slightly, Demonstrating Uncertain Trend

Freight car loadings for the week ended Feb. 21 totaled 713,938 cars, a reduction of 6751 cars from the preceding week. The declines from corresponding weeks of 1930 and 1929 were 113,622 and 191,565 cars, respectively. Comparable weeks of the past two years contained a holiday and the 1931 week did not, the probable effect of the holiday being delayed this year until the week ended Feb. 28. All districts in the country report unfavorable comparisons with the previous week and with last year. Loadings of merchandise in less than carload lots continue to hold up better than other classes of freight. Since early in January freight traffic has remained at practically the same level, alternating small increases with small decreases.

By-Product Coke Production Resists Further Curtailment

Coke output in January was checked in its progressive decline, following a long period of sharply curtailed activity. By-product coke production increased 0.5 per cent, although the smaller proportion involved in beehive production declined 8.3 per cent. Total production of by-product coke was 3,092,153 tons, which was at the rate of 99,747 tons daily. In the previous month the rate was 99,267 tons per day. Compared with output of 4,195,674 tons, or 135,344 tons daily in January, 1930, a decrease of 26.3 per cent was registered. Beehive coke production dropped to 163,000 tons in January from 171,100 in December and 320,200 tons in January, 1930. Daily average output was only 6037 tons, compared with 6581 in the preceding month.



By-Product

	Tons
January, 1931	3,092,153
December, 1930	3,077,290
January, 1930	4,195,674

Beehive

January, 1931	163,000
December, 1930	171,100
January, 1930	320,200

Padlocked Minds

have no use for a Business Paper...

IT'S not so much *what* you read that counts, as what you read it *for.*

Reading to pass the time away is *one* thing—reading to get *ideas* for improving your business is another.

Men completely satisfied with what they have—insensible to progress—oblivious to change—these read (*when* they read) for entertainment only.

But men whose minds are open to better methods, men whose minds are eager for news of new plans and new practices—these are the men who read the pages of their business papers.

In any industry . . . trade . . . profession, these are the men who count. And just as they are attracted to a publication by the practical, helpful character of its editorial content, so, in the same open-minded mood, they read its advertising pages.

ABP

THIS SYMBOL *identifies an ABP paper . . . It stands for honest, known, paid circulation; straightforward business methods, and editorial standards that insure reader interest . . . These are the factors that make a valuable advertising medium.*

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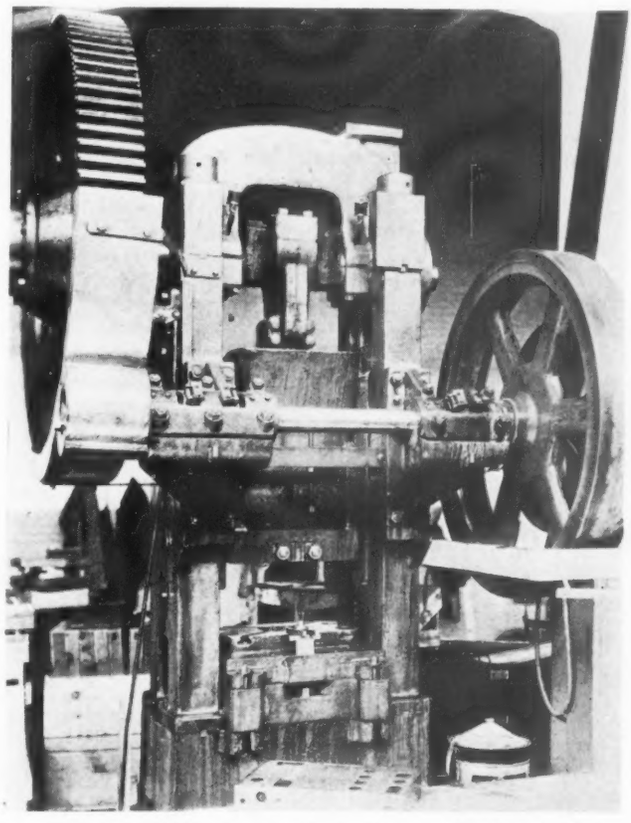
TWO-NINETY-FIVE MADISON AVENUE - NEW YORK CITY

Forming and Heat Treating Radio Parts on Production Basis

BY W. T. FULTON
Surface Combustion Co., New York

MODERN mechanical setups for metal forming and heat treating have been installed in the plant of Stromberg Carlson Telephone Mfg. Co., Rochester, N. Y., where telephones, radios, loud speakers and similar parts are manufactured. The metal forming section is equipped with automatic screw machines for various parts and mechanically driven presses of different types ranging up to 50 tons in capacity. Two of the latter are of unusual design, one being substantially an inverted press, with the ram and flywheel close to the floor. It comprises a steel base with four steel uprights holding a heavy steel mounting from which one of the dies is suspended. Operating continuously with an individual motor, this press or dieing machine, as it is called, is fed with 4-inch cold-rolled strip and is provided with feeding rolls on each end.

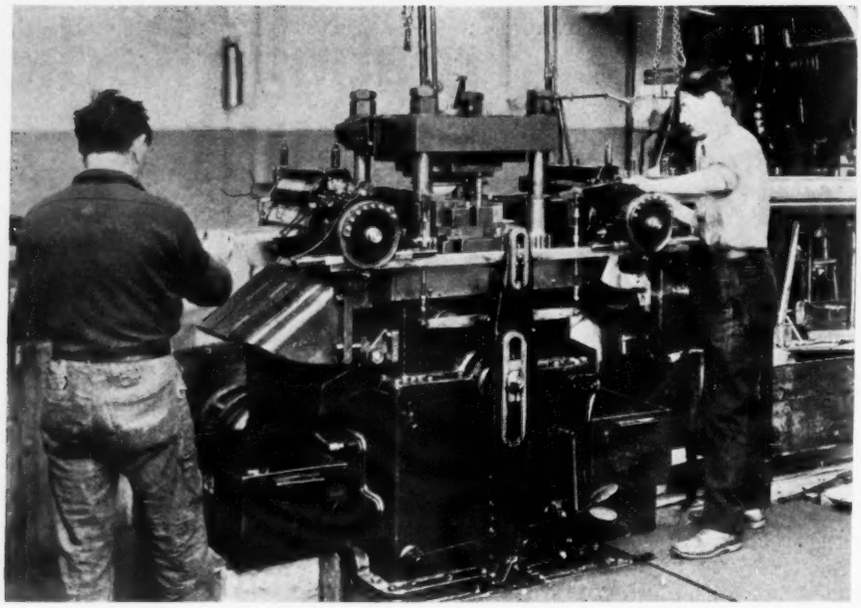


Heavy press which forms and punches radio chassis bases, one of which is shown in the foreground

The parts formed drop down through the bottom die, into a stacking chute and the waste is cut automatically into convenient sizes by a scrap cutter, bolted to the frame. This machine operates at 200 revolutions per minute and will cut 400 pieces per minute.

Small flat springs are formed in a machine, the principal unit of which is two steel rolls, one opposing the other and provided with toothed disks to hold the blanks from slipping. The springs, when blanked, are automatically stacked in a chute and this chute is placed on the spring machine in such a position as to feed the blanks directly into the rolls. The rolls give the blanks the correct spring shape and as the springs adhere to one of the rolls after forming, a sharp stationary knife strips them off so that they fall into a tote box. This machine will form 34,000 springs per hour, compared with a production limit of 1500 to 1800 per hour with a hand-fed press. Inclinable presses also are operated, some being equipped with air nozzles with an automatic valve in the air supply line. When the press has been tripped and the part formed, the air is released mechanically and the part ejected pneumatically from the press into a tote box. Other presses, fed by hand, are provided with mechanical guards which automatically sweep across in front of the dies, when the press is tripped, and keep the hand of the operator out of the way in case he is a little slow. Still other presses are equipped with straightening rolls, on each side of the dies, which straighten the material as it passes through.

Loud speaker frames are formed in 8 and 10-ton presses in five operations, each operation being performed in a separate press and the presses lined up for progressive straight-line production. The radio chassis base is



Inverted press or dieing machine handling 4-inch strip and equipped with feeding rolls and scrap cutter

formed from 11-gage strip steel in 6 operations, in 6 different presses. The strip is of the exact width and the first press cuts to length and bends the ends. In the second, third and fourth presses, 50, 80 and 70 holes respectively are perforated. A forming die in the fifth press turns up the two long edges while the sixth turns them still further and forms box sides 2¾ inches in height. The corners are then spot welded.

Relay cases are formed from sheet aluminum in three draws with an anneal between the second and third draws. They are then trimmed and the ends flattened and perforated. A steel plate to hold the short circuiting ring is blanked from ¼-inch steel and 5 holes perforated in a single operation. These holes must be held within a tolerance of 0.002-inch, otherwise vibration and distortion would be present in the finished loud speaker.

In the automatic screw machine division, shown in an accompanying illustration, the machines are equipped with feeder tubes for the rod stock and these tubes are provided with fixtures which automatically spring yellow signal disks into view when more raw material is required.

The heat treating division is near the metal forming department, and here annealing, hardening, carburizing, etc., are performed. The principal equipment consists of two gas-fired furnaces built by the Surface Combustion Co., Toledo, O. These furnaces are standard types, having definite operating characteristics and being rated specifically as to performance. Each furnace has a hearth 30 by 60 inches and a door opening 18 inches high and 28 inches in width. Four burners are provided on each side, one set firing tangentially against the roof and the other under the hearth, and from the opposite side. This assured circulation of the products of combustion and uniform heating.

Low Pressure Firing

The low-pressure system is used, air being delivered at 1-pound pressure to the automatic proportioning inspirator, while the gas is used at ordinary line pressure. The blower and air pipe may be seen just above the furnace in the illustration on Page 37. The firing system is equipped with an automatic temperature control which operates through a motor valve in a bypass line on the main air line, also shown in the illustration. The main air line has a valve which is opened sufficiently to allow the proper volume of air through to support combustion at the burners, which will just fall short of heating the furnace to the desired temperature. However, with the valve in the bypass open, more than enough air is furnished to heat the furnace. Hence, by the on and off action of the valve in the bypass, the correct temperature is maintained automatically.

The versatility of these furnaces is attested by the fact that while they are used primarily for steel heat treatment—annealing, hardening, nor-

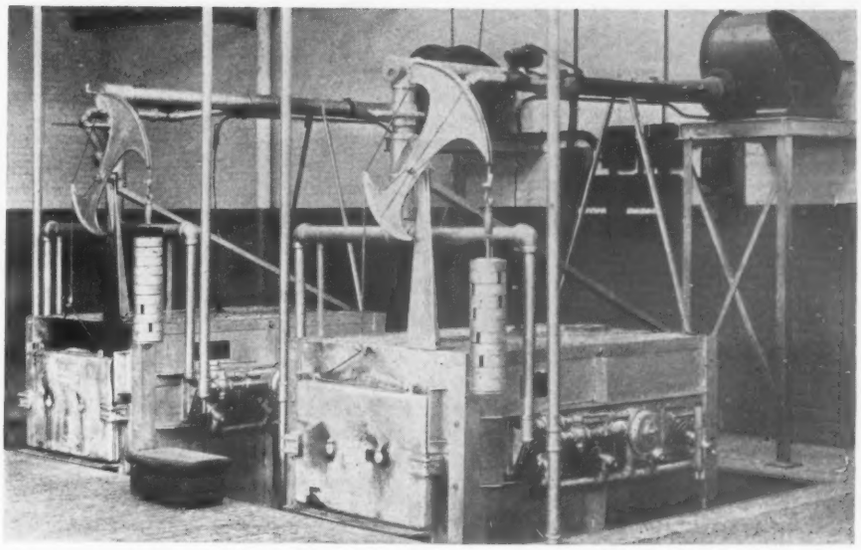
Battery of automatic screw machines for turning out small parts used in radio assemblies

malizing, carburizing case hardening or tempering—they also can be employed for treatment of silver, copper, zinc, aluminum, and even certain types of glassware.

One of the uses for these units in this plant is to draw the magnetism from steel cores. The relay cores for telephone switchboards must be annealed to rid them of their magnetic and electric properties. They are first packed in steel boxes and then the boxes are placed in air tight annealing pots which are sealed with fireclay. Inside the pots and around the steel boxes, is placed a quantity of cast iron chips, further to assure against oxidation.

The pots are then placed in the furnace and heated to 1525 degrees Fahr. for a period of 6 hours. The method used is to bring the furnace and pots up to temperature in the evening, shut off the burners and leave the furnace closed overnight. Loud speaker magnets also are hardened in these furnaces.

As shown in the illustration, the furnaces are installed below the floor level, to bring the hearth level flush with the floor, thus facilitating charging and removing material from the heating chambers.



Heat treating furnaces, fired with low-pressure gas, and installed so that the hearth is flush with the surrounding floor

Testing Materials Society To Meet in Pittsburgh

Regional meeting of the American Society for Testing Materials will be held at William Penn hotel, Pittsburgh, March 18. A feature of the technical program will be a symposium on welding in which the Pittsburgh section of the American Welding society is co-operating. Following morning and afternoon technical sessions a dinner will be held, followed by a special demonstration of the production and analysis of sound and music, arranged by R. C. Hitchcock research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

In connection with the regional meeting, annual spring group committee meetings will be held beginning March 16 and extending through March 20. Over thirty committees and subcommittees of the American Society for Testing Material will convene at this time to discuss the various activities in which they are participating.

Ten papers have been scheduled for presentation at the welding symposium, all of which have been pre-printed. They are as follows:

"General Survey of Welding Processes," by F. T. Llewellyn, United States Steel Corp., New York.
"Welding Processes Applicable to Aluminum," by W. M. Dunlap, Aluminum Research Laboratories, New Kensington, Pa.
"The Quality of Materials for Fusion Welding," by C. R. Texter and F. N. Speller, National Tube Co., Pittsburgh.
"Modern Applications of Arc Welding," by A. M. Candy, welding engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
"Recent Developments in Welding and Cutting," by E. J. Egger, development engineer, Linde Air Products Co., New York.
"Stethoscopic Examination of Welded Products," by J. R. Dawson, metallurgical engineer, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.
"Tests of Welding Made at Watertown Arsenal," by Col. G. F. Jenks, Watertown arsenal, Watertown, Mass.
"Magnetic Methods of Testing Butt Welds," by T. R. Watts, research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
"Fatigue and Impact Testing of Welded Products," by T. M. Jasper, director of research, A. O. Smith Corp., Milwaukee.
"Welding Inspection," by R. Kraus, supervisor of welding inspection, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Employs Photoelectric Control for Operating Soaking Pit Covers

A NEW design of soaking pit control, which employs a light-sensitive relay as the initiating source, is being built for a steelworks in the Chicago district by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The moving crane carries only a foot-operated push button and a light box mounted on the end of the crane for each soaking pit spanned. In this installation the layout includes two soaking pit cranes operated on a common runway and each spanning two pits. There are seven rows of two pits.

The crane operator runs his crane over the pit cover to be removed. The operating light box is long enough to allow for a considerable zone of operation. Preparatory to opening a pit or during the operation, the crane may be shifted 5 feet on either side of the center line and the operating lamp box still will be opposite the light relay for that cover.

To remove the cover a single short flash of the lamps in the light box is all that is necessary. As light falls on the light sensitive tube in the light relay it passes current which energizes a relay that starts the pit cover motor in the open direction. The circuit is self-maintaining; the motor continues to run until the cover is removed entirely, when it is stopped automatically by a limit switch.

When the ingot is withdrawn the crane operator again flashes the crane light and the circuit is now such that the motor is energized by the light relay to replace the cover. A simple transfer circuit permits the light relay to be effective alternately to remove or replace the pit cover. Thus, the light circuit alone is not relied upon to hold the cover open and there is no danger that the burnout of a lamp would close the cover on the tongs of the crane. Supplementary master switches are provided on the floor for the use of the furnace attendants in occasionally inspecting a heat. Interlocking is used which gives the crane operator supervisory control. Should a floor operator attempt to replace a cover from which the crane was withdrawing an ingot, the crane operator immediately could arrest the cover movement.

New Carburizing Bath Affords Increase in Depth of Case

BY E. C. MOFFETT
American Cyanamid Co.

LIQUID case-hardening baths present certain distinct advantages over pack or gas carburizing. Among these are uniformity of heating, rate of heating, ease of control, flexibility of the operation and cleanness of the steel treated. Liquids are the ideal carriers of heat. No time is lost in bringing the charge of steel up to temperature. The work is placed in the bath usually at room temperature and is coated instantly with a layer of solidified salt which melts slowly enough to prevent overheating of the surface and consequent distortion of thin or irregular shaped pieces. As liquid baths are used for shallow cases the duration of heat is short and grain growth is prevented. The fused salt, maintained at uniform temperature throughout the mass by convection currents, supplies heat evenly to all immersed surfaces of the steel pieces.

The depth of case desired readily is produced in a liquid bath since the rate of carbon penetration at any given temperature is well known. The total mass heated is small and quickly responds to the application or removal of heat so that the period during which the steel is "at heat" can be determined accurately. A drop in temperature is recorded immediately when the charge is placed in the pot and as soon as the instrument indicates the return of the liquid to the desired temperature the steel is at heat. It is not possible to duplicate this control in any other heating medium.

Process Is Flexible

Liquid case-hardening baths permit of great flexibility of operations. This is of importance in the small shop or toolroom where frequently the bath is filled with parts requiring different depths of case or varying lengths of heat treatment at the same temperature. Each batch or tool can be removed after the specified time has elapsed without disturbing the balance of the charge in the pot. Depth of case is varied by lengthening or shortening the duration of heating and frequently steel is allowed to absorb carbon at one temperature and then cooled in the same bath to a lower temperature more desirable for quenching. Thus a double purpose is accomplished without the use of two separate temperatures.

A point much in the favor of the liquid baths is the appearance of the finished work. Sufficient salt clings to the steel to prevent too rapid cooling and oxidation between the bath and the quench tank. Soft spots are eliminated and washing removes the salt leaving the surface of the metal bright and uniformly hard.

The case-hardening operation by means of a liquid bath is carried out in a round or rectangular pot heated in a gas, oil, or electric furnace, which should be equipped with a pyrometer and preferably, with an automatic control to enable the maintenance of a constant temperature throughout the treatment, thus insuring uniform production. All things considered, the gas-fired furnace is the most desirable to use whenever the cost of gas is favorable. It gives fast heating, desirable for light case work, is controlled readily, is cleaner than fuel oil, and also lends itself more readily than oil to the maintenance of a reducing atmosphere in the combustion chamber which is necessary to obtain satisfactory pot life. Electricity has most of the advantages of gas but has several serious disadvantages chief of which is cost of current. It has the further disadvantages of the higher cost of repairs usually including a new heating element, following a pot failure, and the inflexibility of the rate of heating.

The furnace usually consists of a steel shell lined with a row of good heat insulating brick and an inner lining of fire clay brick. The spacing between the brick and the pot should be so designed and the burners so placed that the flame never impinges directly upon the pot as this greatly reduces pot life. A satisfactory arrangement is to have the burner or burners set near the top, directed so that the flame will sweep tangentially around the pot and the spent gases pass out through a vent at the bottom of the combustion chamber. These exhaust gases often are used to pre-heat work before immersion in the bath and when so used effect a considerable saving in fuel particularly on shallow case work. Satisfactory furnaces can be built at a surprisingly low cost but where experience is lacking it is more desirable to purchase furnaces built by a reliable manufacturer.

Steel Pots Required

The pot should be of pressed or cast steel, or a heat-resisting alloy, the choice being influenced by the type of furnace and the type of work to be processed. Cast iron or welded pots are unsatisfactory and their use is to be avoided because such pots soon disintegrate and allow the molten bath to seep through.

The furnace should be equipped with a hood connected with a ventilating system, preferably having a forced draft. This is essential when some baths are being used due to the heavy vapor or fume which is thrown off, the fume being irritating to the membrane of the nose and throat. The hood also is a safety feature insisted upon by many employers because it protects the worker from splashing bath material when the furnace is being loaded.

Case hardening is not a modern art although it has become of commercial importance since the advent of the bicycle and the motor car. We are informed that the Chinese used case hardening processes during the eighth century and a Benedictine monk in the ninth century wrote a book giving instructions for the case-hardening of files. The earliest approach to the use of a liquid bath was case hardening by means of pastes spread on the steel with a brush. The coated article was heated in a forge fire until the paste melted and then quenched. Occasionally powdered materials were sprinkled on the hot steel and allowed to react for a few minutes before quenching. These pastes almost always contained material which formed cyanides on heating. Potassium ferrocyanide,

HARDENING steel in a bath of sodium cyanide largely has been confined to case depths under 0.010-inch. The limitations, however, have been removed by a salt bath composed of sodium and calcium chlorides and an activating ingredient, as discussed by the author in the accompanying paper which recently was presented before the New York chapter of the American Society for Steel Treating. E. C. Moffett is an associate in the technical department, American Cyanamid Co., New York.

Results of Case-Hardening Treatment of S. A. E. 1020 Steel

		1550 degrees Fahr.			1600 degrees Fahr.		
		1 hour	2 hours	3 hours	1 hour	2 hours	3 hours
Depth of case, inches	Aerocase	0.013	0.020	0.024	0.016	0.025	0.030
	Cyanide	0.010	0.016	0.018	0.010	0.012	0.015
Carbon content of outer 0.005-inch case, per cent	Aerocase	0.90	0.98	1.02	1.00	1.10	1.15
	Cyanide	0.62	0.72	0.74	0.50	0.63	0.63
Hardness, Rockwell "C"	Aerocase	59	63	65	61	63	64
	Cyanide	50	59	60	53	58	61
Impact value, foot pounds	Aerocase	7.0	4.5	4.5	5.0	4.7	4.3
	Cyanide	6.0	4.0	4.0	3.5	4.5	3.5
Pack carburized to a case depth in inches of		0.019 (6½ hours) at 1650 degrees Fahr.			0.031 (8½ hours) at 1650 degrees Fahr.		
Carbon content, per cent		0.88			0.99		
Rockwell "C"		56.5			58		
Impact value, foot pounds		3			3		

horn or leather and an oxidizing compound such as potassium bichromate or nitrate were favorite materials for this purpose. Many successful file manufacturers still use this old method.

Similar Results Obtained

Potassium cyanide was probably the first material used extensively in the molten condition as a liquid bath. This form of cyanide was a commercial product before sodium cyanide was available and still is used but in a relatively small amount. Literature contains little information about the results produced by potassium cyanide, but it is believed that the hardness and the rate of penetration are about the same as are obtained with sodium cyanide. Many old-time hardeners claim that the fume is less irritating.

Sodium cyanide has been used almost exclusively since about 1900. The high-grade material, containing 96 to 98 per cent sodium cyanide (NaCN) was used first and later the mixture containing some salt and sodium carbonate. Manufacturers frequently are asked to state the rate of deterioration of sodium cyanide. Hillman and Clark have prepared a paper showing graphically the results obtained. Baths of "96-98" grade and "43" grade were operated for 42 hours at 1500 degrees Fahr. under normal production requirements. A series of analyses of the baths were made over the period at 3-hour intervals, and curves were plotted from the results. Three runs were made using each grade of sodium cyanide.

The higher analysis material showed a uniform deterioration, the curve representing it being almost a straight line for 10 hours. The average rate of deterioration for the three runs during this period was about 5 per cent per hour, while for the next 10 hours the average was 2 per cent per hour. A cyanide concentration of about 30 per cent is necessary to give good penetration and hardness on low-carbon steel. Using the curves as a guide and at 30 per cent concentration, the average rate of deterioration is between 2 and 3 per cent per hour. This rate also holds for the "43" grade materials and therefore it is necessary to add every hour 2 to 3 pounds of "96-98," or about 4 to 6 pounds of "43" per 100 pounds of bath material to maintain the correct cyanide concentration, when the operation is conducted at 1500 to 1550 degrees Fahr. Higher temperatures decompose the cyanide more rapidly and consequently larger quantities must be added to maintain the strength.

The materials popularly known as "43" and "27" contain that amount of sodium cyanide respectively, the balance of each mixture consisting of equal parts of sodium chloride and sodium carbonate. The "43" grade is used for hardening medium-carbon steel and for producing a slight case on low-carbon steel. The strength of the bath frequently is maintained by additions of 96/98. The "27" grade is used almost exclusively for hardening medium and high-carbon steels requiring no case. These mixtures fume less than 96/98 because of the lower vapor pressure due to the sodium chloride. Sodium cyanide is the actual active case-hardening agent in these mixtures. Failure to maintain the correct concentration results in lack of case depth and hardness.

Sludge Forms in Bath

Users frequently complain of a sludge or slag in cyanide baths. This sludge is an accumulation of iron particles, carried into the bath as chips, scale or even rust. The cyanide reduces the rust or oxide to metal and frequently deposits carbon on it. If the cyanide concentration of the bath is allowed to fall, the sludge settles to the bottom of the pot. It rises with the foam when a fresh addition of cyanide is made. It should be skimmed off at once. In fact, it is advisable to explore the bottom of the pot once or twice a week and remove accumulated sludge by means of a dipper.

The use of temperatures in excess of 1550 degrees Fahr. results in rapid deterioration of the cyanide and does not increase the rate of penetration. Experimental work has demonstrated that the depth of case

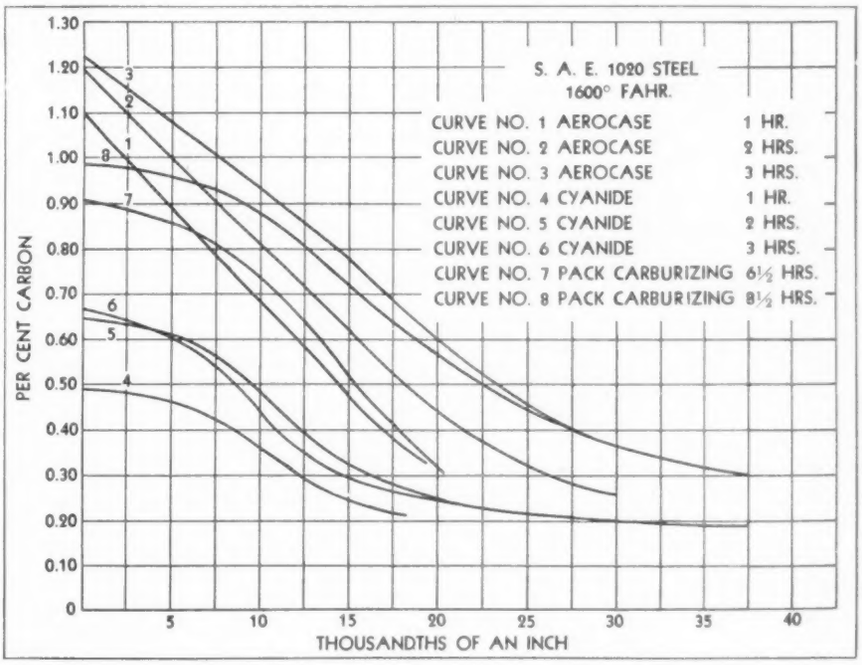


Fig. 1—Curves depicting the distribution of carbon effected by the sodium cyanide, pack carburizing and liquid carburizing processes

and its carbon content are less when steel is treated at 1600 degrees Fahr. than at 1550 degrees Fahr. for the same time. The carbon penetration is uniform throughout the bath at temperatures below 1550 degrees Fahr. while at 1600 degrees Fahr. it varies from the top to the bottom of the bath. This lack of uniformity is noticeable when comparatively deep pots are used, and is illustrated by heating a wire in a 30 per cent cyanide bath 15 inches deep.

In this experiment the wire reached to the bottom of the pot and was treated for 1 hour at 1600 degrees Fahr. and quenched in water. The wire was broken and the depth of case measured at 2-inch intervals. It varied from 0.013-inch at the top of the bath to 0.004-inch at the bottom, the top 8-inches of the bath being fairly uniform in depth of case produced. This lack of uniformity was apparent when treating triple notched Izod bars suspended vertically in sodium cyanide at 1600 degrees Fahr. The Rockwell hardness readings varied from the top to the lower end of the 5-inch bars, the hardness of the lower end being invariably less than at the top and amounted to nine points in the case of S. A. E. 4615 steel, treated for 1 hour, and 19 points in the case of 1020 steel treated for 2 hours. Other steels showed marked differences in hardness.

Directions Are Summarized

The general instructions for sodium cyanide case hardening are:

1. Select a compound of correct analysis for the job.

2. Use a pot of correct dimensions. Pots 18 inches in diameter and 18 inches deep; or, 24 inches long, 15 inches wide and 15 inches deep have proved most satisfactory and economical for heavy production schedules.

3. Maintain a cyanide concentration of 30 per cent where a case depth of 0.005-inch is desired.

4. Keep the bath free from sludge.

5. Do not operate at a temperature higher than 1550 degrees Fahr.

Sodium cyanide baths rarely are used to produce case depths greater than 0.010-inch because beyond this point the rate of penetration is slow and is not economical. This limitation of sodium cyanide led to a comparatively recent development in liquid bath case hardening known as the "Aerocase" process. This process uses a molten salt bath to which case-hardening properties are imparted by the addition of small quantities of an activating material.

The characteristics of this process are:

1. The case produced is of uniform depth, extremely hard and is not brittle.

2. Only 3 hours at a temperature of 1600 to 1625 degrees Fahr. are required to produce a case of 0.032-inch.

3. The bath during operation at 1600 degrees Fahr. fumes only to a slight extent; the fumes are not irritating.

4. The molten bath has no corrosive action on the pot.

5. The bath can be used in the temperature range from 1425 to 1650 degrees Fahr.

6. The bath can be used as a neutral heat-treating medium or for carburizing by varying the quantity of activating material added.

7. The activating ingredient is calcium cyanide.

8. The salt bath is a mixture of anhydrous sodium and calcium chlorides.

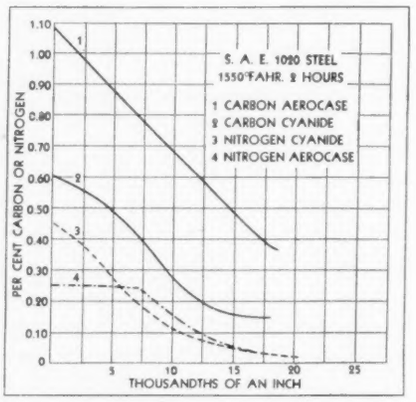


Fig. 2—Curve showing carbon penetration of steel subjected to the liquid-carburizing process

This bath is extremely useful in producing cases in the range of 0.005 to 0.032-inch but is not limited to these depths. Carburizing temperatures of 1650 to 1700 degrees Fahr. accelerate the rate of carbon penetration so that case depths greater than 0.032-inch can be produced in 3 hours. The temperature to be maintained and the period of immersion are determined by the characteristics of the steel and the hardness and depth of case it is desired to produce.

How Operation Is Executed

The case-hardening operation is carried out in the usual furnace and pot equipment. To start a fresh bath, the salt mixture is introduced into a new or thoroughly cleaned pot and melted, additions being made as the material melts completely. The level of the bath when loaded with steel to be treated should be about 1 inch below the top of the pot. When the molten salt has reached the temperature of 1400 degrees Fahr. a quantity of activating material is added according to the proportions required, as later mentioned. It is allowed to melt and react for 10 minutes. This first addition of the activating material causes the impurities and dirt adhering to the pot to collect at the surface of the bath as a black scum. This should be skimmed off with a perforated ladle. When the temperature of the bath reaches that at which the case-hardening operation is to be performed, a second addition of the activating material of equal weight to the first is made. The bath now is ready for use.

The amount of activating material to be added varies from ½ to 1 per cent of the weight of the salt mixture contained in the pot. A salt mixture of 110 pounds in the molten state occupies 1 cubic foot of space. The concentration of the activating material in the bath must be maintained during operation, to insure the production of a uniform case of the desired depth and hardness. This is done by the addition every hour of an amount of activating material as previously mentioned. Additions of a higher percentage, say ¾ to 1 per cent, are recommended only when the operating temperature is above 1600 degrees Fahr. and the surface of the steel treated is large.

Almost no volatilization of salts from this bath occurs, and consequently the temperatures used may be considerably higher than with other baths. Furthermore, the molten bath is extremely fluid and little salt is lost by adherence to the work removed from the bath. Experience has shown that 2½ pounds of the salt mixture should be added to the bath during continuous operation for every pound of the activating material which has been added.

Test Results Are Compared

The results obtainable by use of this process have been determined by laboratory work and compared with those obtained by use of cyanide and by pack carburizing. The steels used in this investigation were S. A. E. 1015, 1020, 2315, 3115, 5115, 6116, and 4615. Standard triple notched Izod bars were used for the determination of the hardness and impact value. Round bars, ¾-inch diameter and 6 inches long were used for the determination of the carbon concentration and penetration.

The carburized pieces were treated as follows: All specimens were packed in a commercial carburizing compound in heat-resisting alloy boxes of the approximate dimensions, 18 x 9 x 14 inches deep. The boxes were charged into a furnace large enough to hold 20 such boxes and heated at 1650 degrees Fahr. for a total furnace time of 6½ hours and 8½ hours. Approximately 4½ to 5 hours of this time were required to bring the boxes up to temperature. After the specified time had elapsed, the boxes were removed from the furnace and were allowed to cool to atmospheric temperature before they were dumped. The round test bars then were cleaned thoroughly and successive cuts of 0.005-inch on the

The trolley wheels are vital points in Robbins & Myers I-beam hoists, so of course they are protected with Timken Bearings

Where radial, thrust and combined loads must be countered, as well as friction eliminated, the majority of the leading manufacturers of all types of machinery select Timken Bearings.

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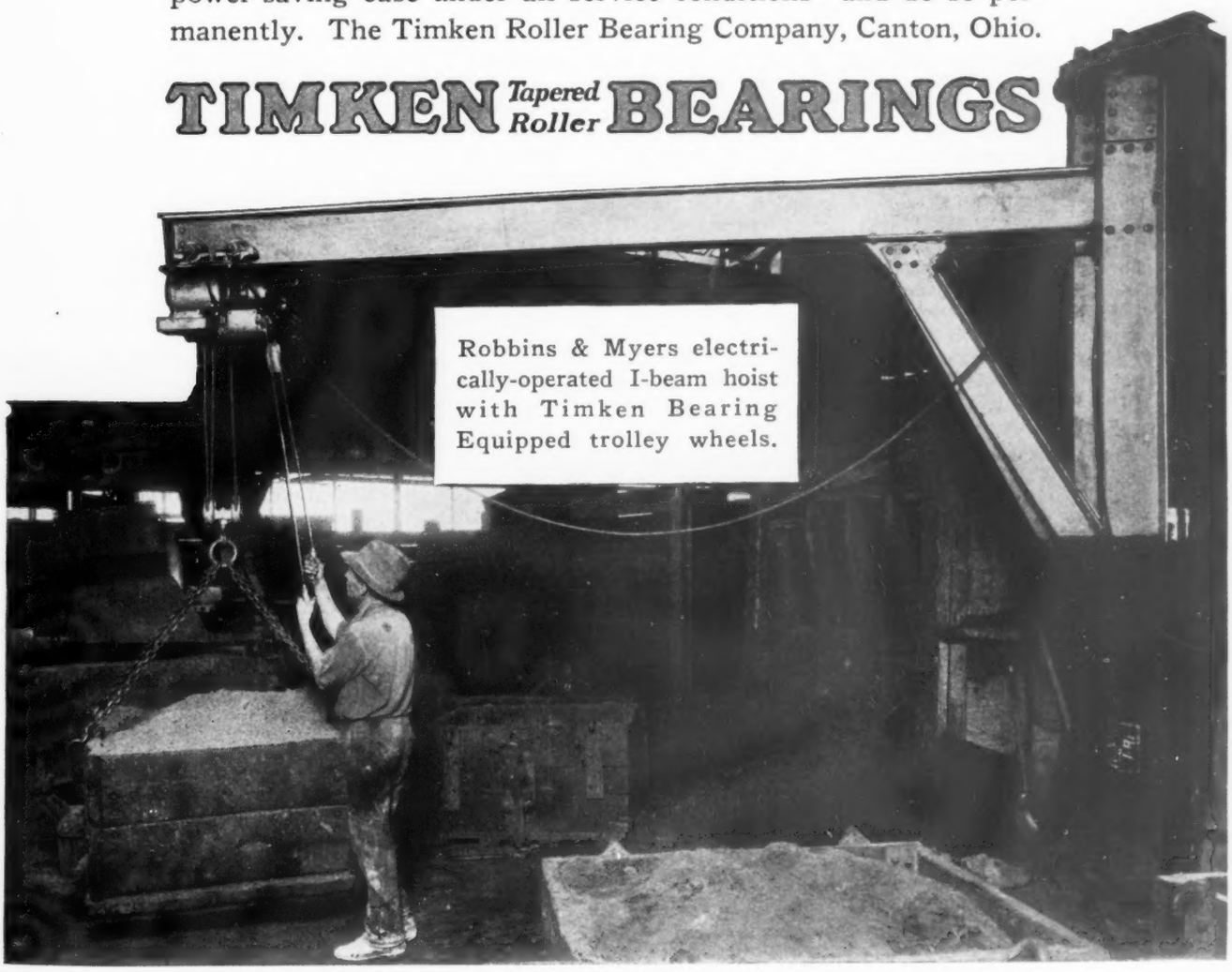
Robbins & Myers, Inc., Springfield, Ohio, use Timkens in the trolley wheels of their I-beam hoists to give the wheels the stability they must have, and to enable them to roll with frictionless, power-saving ease under all service conditions—and do so permanently. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN *Tapered Roller* **BEARINGS**



Robbins & Myers electrically-operated I-beam hoist with Timken Bearing Equipped trolley wheels.

radius were removed in a lathe, the chips subsequently being analyzed for carbon by the combustion method. The Izod bars were reheated in an oil-fired muffle furnace at 1420 degrees Fahr. Sufficient time was allowed for the specimens to become thoroughly heated through. The plain-carbon steels were quenched in water and the alloy steels were quenched in oil.

Similar Bars Tested

Similar Izod bars and round bars were treated in the Aerocase bath heated in an automatically controlled electric furnace at 1550 and 1600 degrees Fahr. for periods of 1, 2 and 3 hours. The carbon bars were cooled in lime and subsequently cleaned and sampled for the carbon determination. The Izod bars of the plain-carbon steels were quenched in water and the alloy steels were quenched in oil. A similar procedure was used in the treatment of the samples in a bath containing 30 per cent of sodium cyanide, the cyanide concentration being checked and corrected every half hour.

The results obtained by these three methods of treatment have been tabulated, the figures relating to the S. A. E. 1020 steel being shown in the accompanying table. This steel is used for many purposes. No wide variation in the rate of carbon penetration or concentration is to be noted in the different steels when treated in the same bath. The hardness readings vary somewhat according to the analysis of the steel, while the impact values as might be expected do show a fairly wide variation. For instance, a bar of S. A. E. 1020 steel treated for 3 hours at 1550 degrees Fahr. in the Aerocase bath had an impact value of 4½ foot pounds, while a bar of S. A. E. 6115 steel treated in a similar manner showed an impact value of 38 foot pounds. These two steels when treated in sodium cyanide showed variations which were of similar magnitude.

Fig. 1 shows the carbon distribution. Curves 4, 5, and 6 depicting the results obtained in sodium cyanide are similar in shape and slope to curves 7 and 8 obtained by pack carburizing, while curves 1, 2 and 3 representing the results obtained in the Aerocase bath are almost straight lines. Experience has shown that the case represented by these curves is confined to the core and does not chip or spall. The aerocase process has been called a liquid carburizing process. Its claim to this classification is illustrated by the curves in Fig. 2.

Experimental work discloses that carbon and nitrogen are added in about equal amounts by sodium cyanide. This readily is apparent in the outer portion of the case when the percentage of carbon originally present in S. A. E. 1020 steel is deducted from the carbon content of the case. Carbon shown in the sodium cyanide curves is 0.56 per cent. Deducting 0.20 per cent gives 0.36 per cent added carbon. The nitrogen is 0.38 per cent or a ratio of carbon to nitrogen of about 1:1. In the curves of the aerocase process the carbon is 0.98 per cent. Deducting 0.20 per cent gives 0.78 per cent added carbon. Nitrogen in the same portion of the case is 0.25 per cent or a ratio of carbon to nitrogen of 3.1:1.

Differences Readily Apparent

A comparison of the sodium cyanide and aerocase baths shows marked differences. The active reagent in both baths is a cyanide, its concentration being about 30 per cent in the average sodium cyanide bath and only between 0.2 and 0.3 per cent in the aerocase. The calcium cyanide in the aerocase bath is the active reagent, and its chemical reactions in case hardening are entirely different from those of sodium cyanide.

The mechanism of the absorption of carbon by iron or steel in the aerocase bath can be represented by the following equations:

$$Ca(CN)_2 = CaCN_2 + C \qquad (1)$$

$$3Fe + C = Fe_3C \qquad (2)$$

The reaction mechanism in a sodium cyanide bath is much more involved and though considerable experimental work has been done, the problem has not been solved entirely. That the reaction mechanism is unlike that in the aerocase bath is indicated by the difference: First, in the reaction between sodium carbide and nitrogen and that of calcium carbide and nitrogen. In the first case the reaction is:

$$Na_2C_2 + N_2 = 2NaCN$$

in the second case:

$$CaC_2 + N_2 = CaCN_2 + C$$

and second, in the reaction of the two cyanides when heated. The decomposition of sodium cyanide is represented by the equations:

$$2NaCN = Na_2C_2 + N_2$$

$$Na_2C_2 = 2Na + 2C$$

and the decomposition of calcium cyanide by the equation:

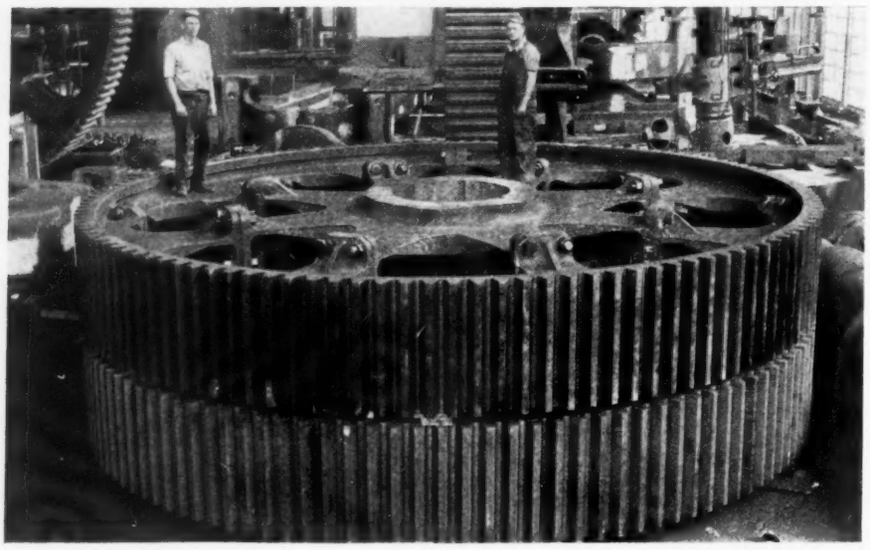
$$Ca(CN)_2 = CaCN_2 + C$$

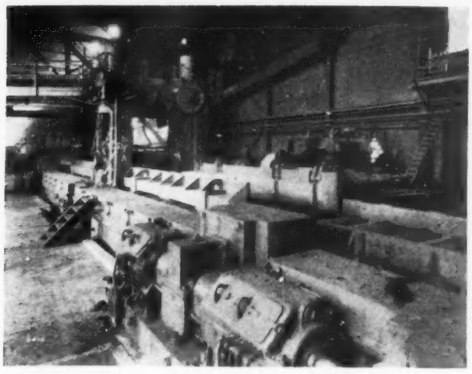
Casts and Machines 138-Ton Gear for Steelworks Installation

PROGRESS in foundry practice is typified by the accompanying illustration which presents striking evidence of the magnitude of the machinery that is being utilized by the rolling mill industry in this country.

The gear, 21 feet 4 inches diameter and weighing 138 tons, was produced at the Youngstown, O., division of the United Engineering & Foundry Co. for a steel mill installation in the Chicago district. The unit is built of two rims which consist of four segments and a center spider, all joints being machined within limits of 0.003-inch before being keyed and bolted together.

The gear has 268 teeth, the maximum error allowed for their spacing being 0.008-inch. The teeth were cut at a speed of 190 feet a minute and at a feed of 2⅛ inches a minute with the cutter flooded with a coolant. The keyways on the gear to match those on the spider were cut on a horizontal slotter.





A good example of efficient steel mill equipment is this Mesta 40" Blooming Mill . . . Hyattized to safeguard long equipment life and freedom from operating interruptions.

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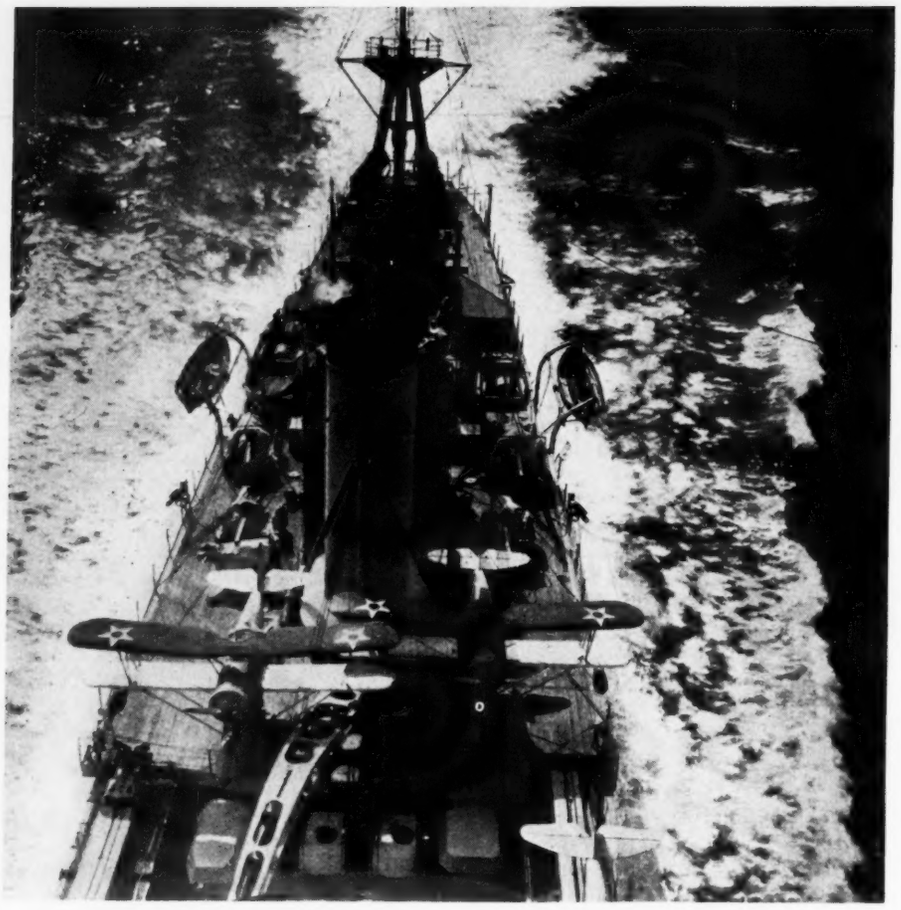


U. S. S. Salt Lake City *with Wasp-powered Vaught Corsairs on deck*

Aims at Indestructible Steel for Building Warships

BY KAYE BARON LANSDOWNE

LESSONS learned during the World war have intensified the need for new and improved metals for naval construction and since then a great impetus has been given the improvement of metallurgical products for practically all engineering purposes. Except for the production of armor, and even this is to be much lighter and thinner than in present active ships, the principal economic benefits of naval building schedules will go to producers of the so-called corrosion-resisting steels. Producers of aluminum alloys likely will figure second in the contract lists, considering direct naval orders and the contract orders of builders for auxiliary equipment.

The lead taken by the Germans in the construction of the Ersatz Preussen, a 10,000-ton vessel with all the characteristics of a battleship, and mounting 11-inch rifles, was due directly to the advantage of modern light alloys. The latter afford the construction of a vessel having the displacement of one of our cruisers, a ship that could shoot any of them out of the water and eclipse them in speed.

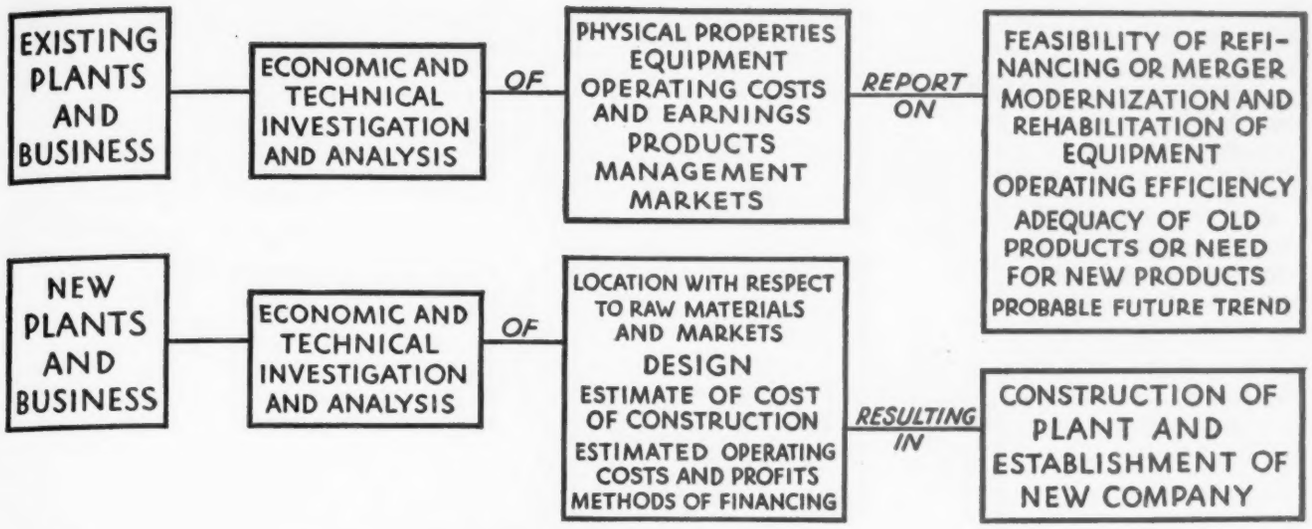
Builds Light Cruisers

The United States navy already has built about 18 pre-Ersatz Preussen type cruisers and other nations have done likewise, but the German ship undoubtedly marked a new era in naval shipbuilding. It marked the era of ships skillfully constructed of light alloys, but utilizing strengthened parts of heavier metals where strains would be greatest. As a matter of fact, it indicated an entirely new order of things in naval and mercantile shipbuilding, for where a naval ship can save military weight to get under an allowed treaty category, a merchantman can save the same weight to be applied to increased cargoes.

For several years, beginning with the infancy of the corrosion-resisting steels, the navy was the largest individual consumer in this country and still maintains an important place among the leading consumers of the so-called stainless steels. In 1921, this material was adopted as standard for submarine periscopes and it is used regularly for many structural purposes in the form of structural shapes, plates, rods, bolts, nuts and forgings.

When the submarine V-5 was constructed several years ago, the navy forged the windlass gears of corrosion-resisting steel, these being at the time, the largest forgings of this material ever made in this country, and they equaled the largest forgings in Germany, where the basic patents for these steels still are owned. Wire rope made of this steel first was used by the navy on submarines and is now standard equipment. A special study has been made of the welding of corrosion-resisting steel and one of the most important installations of welded tank construction now is being sponsored by the bureau of construction and repair of the navy.

However, contracts for the new ships will reveal as much ingenuity in applying corrosion-resisting steel



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and in servicing it, as in its actual use. The Naval Research laboratory, Bellevue, District of Columbia, has completed tests which shortly will be presented by naval officer members of steel-treating societies. A magnetic analysis machine now is being used to detect the defects in metals due to errors in manufacture or treatment. Investigations of a hardened copper alloy to replace a phosphor bronze metal also are under way at the laboratories.

Definite allowances will be made on steel containing zirconium sulphide to produce a free-machining corrosion-resisting steel. The investigation of corrosion fatigue of metals has reached a stage where a definite relationship between stress range and the rate of damage due to combined stress and corrosion can be stated in the form of an equation. This knowledge is of great importance in preventing failures in structures and is of equal value on land and sea.

Studies Insulating Material

The navy also has in progress an investigation of the heat-insulating properties of bright aluminum foil in several layers as a pipe covering, and already has shown this method to be excellent and important as a weight saving factor. An examination of the suitability of welded pipes in sea-going vessels, in place of flanged joints, to save weight also is being made. All these data, as well as that obtained from the investigation of various metals will be made available to all government and civil enginneering departments in the near future.

The navy is securing some of its most important data from a field not generally regarded as akin to that of general building, namely, aviation. One of the interesting material investigations here has been in the field of corrosion-resisting steels. Streamline tie-rods made of various steel compositions are being service tested; sea plane floats of corrosion-resisting steel are actually under construction.

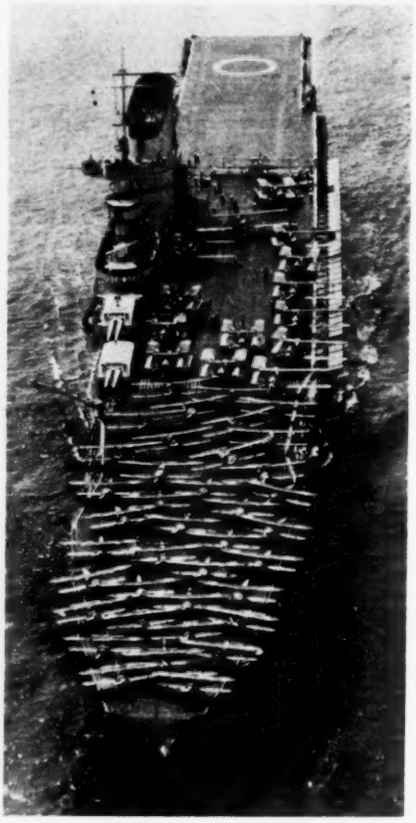
Apparently the suitability of aluminum alloys in aviation is going to be contested severely by steel. Ribs constructed of spot-welded corrosion-resisting steel strip are being incorporated in wings of certain military planes. Sources of supply for this material in sheet, bar, and seamless tubing and methods of handling and working it, are under development.

Assertions frequently are made that future aircraft will be of steel construction. If this becomes an actuality the general field of metal construction will benefit through refinements enforced by aeronautical engineering. These steels will naturally figure heavily in new surface ship construction.

Special treatment steels, and bullet-proof steels are being developed in cooperation with leading manufacturers and metallurgists in this country. Emphasis is being laid on the bullet-proof steels for all types of vessels, owing to the fact that future construction of naval vessels will lay great stress on high speeds, depending on speed to offset enemy gun-fire accuracy, and on bullet-proof shields for close-up fighting when such becomes absolutely necessary.

For some time, tests have been in progress in small-scale models to determine the strength of thin reinforced shells (submarine pressure hulls) under external pressure. More than 50 models were built and tested in the past year. Steel sheets of more uniform quality were obtained for the construction of models, as a result of studies in this field. The benefits will be extended to all industry. The navy is finishing a long series of tests of electrically-welded hydraulic speed gears, with the purpose of securing data on which to issue to both the service and civilians, standard specifications for welding procedure, and to revise existing instructions. This work is of great importance in view of the rapid extension of welding in ship construction. The new German ERSATZ PREUSSEN class also took the world lead in this angle.

Tests which will include studies in shear, bending, cracking, concentration of stresses, and finally tests of ship girders to failure in hogged and sagged conditions, will be made on the U. S. S. CUYAMA before the new ships are finished, in order to afford guidance for studies looking to the increase of strength in the newer steels to be furnished.



Looking down on the aircraft carrier LEXINGTON *with its armada of Martin bombers*

Two destroyers have been set aside from the active navy list, to be given similar tests. Longitudinal strength and stress tests also will be executed. This will be the first time that structural tests have been carried to destruction of the actual girders, and will make possible the determination of factors of safety that exist in the designs. The only tests approaching these were made in 1925, when the battleship NEVADA fired her main turrets dead ahead. Ships ordinarily fire either to port or starboard, to enable the ships to swing and absorb recoil forces. The effect in firing dead ahead is much as though the ship actually were being hit by projectiles, inasmuch as it cannot adequately take up recoil dead astern or dead ahead. The findings at that time were secret. The new tests will be kept secret only in certain provinces.

New Treatise Available

A new naval treatise on iron and steel has been prepared for use in the next edition of the *Naval Artificer's Manual*, which can be obtained by reputable manufacturers and engineers.

In new construction, the navy will make another step forward in anchor chain, turning to probably the die-lock steel chain that has been developed at the Boston navy yard. It already has been put aboard two light cruisers, two submarines, a mine sweeper and a submarine rescue ship. It has been found rather superior in tensile strength to cast-steel chain which was already in process of displacing wrought-iron chain. Cast-steel chain will be displaced gradually, however, for it is able to withstand long service periods without periodic heat treatment. Cast steel chain in large sizes for battleships may prevail for many years because in large sizes it is cheaper than steel chain of the die-lock type.

Welding of Buildings Now Permitted in 100 Cities

One hundred cities and towns in the United States have adopted legal provision providing for the use of welding in building construction, according to Frank P. McKibben, consulting engineer for the General Electric Co., Schenectady, N. Y.

Of this total, 90 have adopted welding in accordance with the Pacific Coast Building Officials Conference code, six the American Welding Society's code and four miscellaneous unclassified codes.

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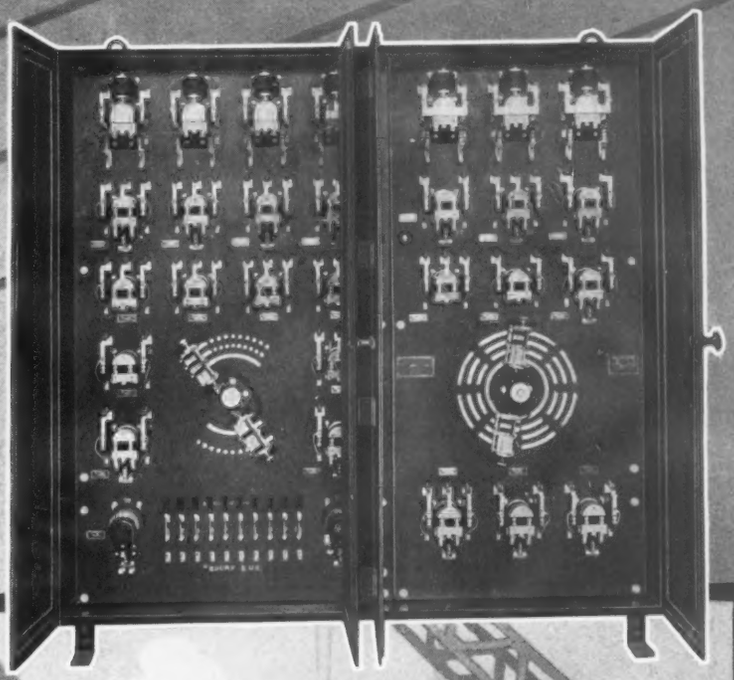

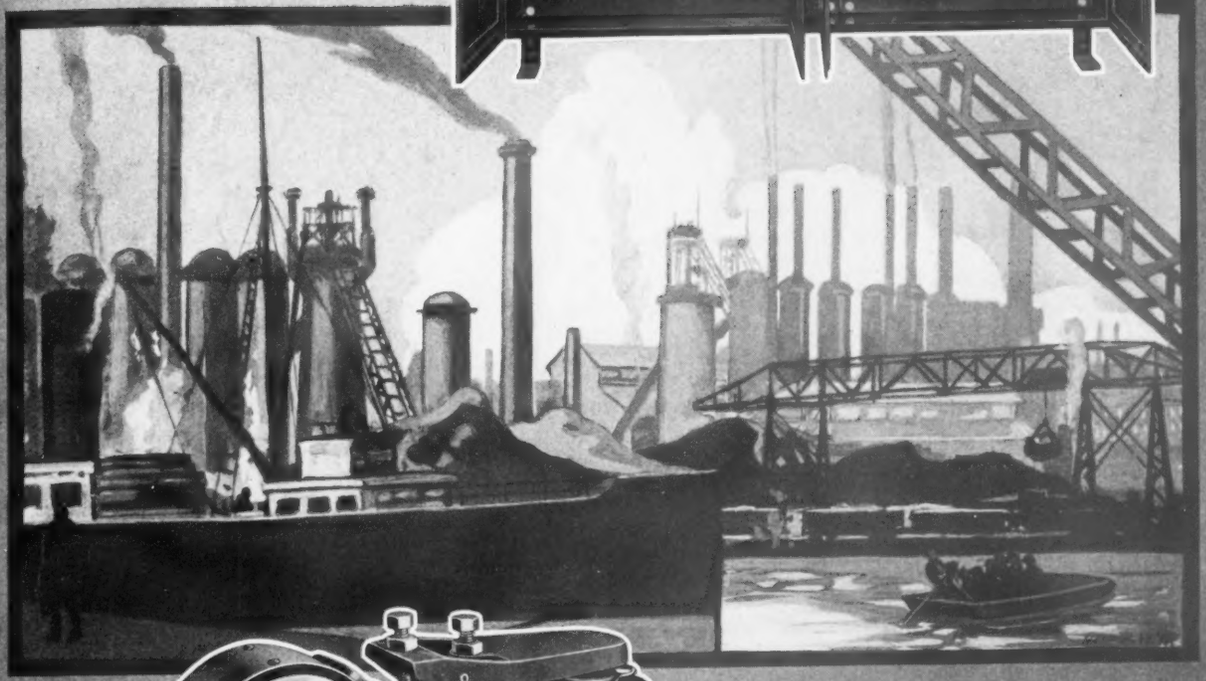

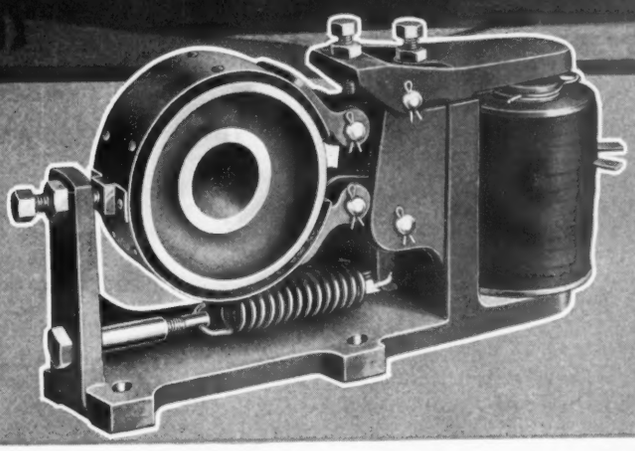

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Steel Timbre a Controlling Factor in Service Life

WHEN parts made from a given steel are subjected to identical heat treatments, uniform results are expected. Unfortunately, however, uniform results do not always follow uniform heat treatment because the steel has a definite personality or timbre. Steel may have a chemical composition well within the limits of a correct specification, and yet be entirely unsuited for a specific use. A common example of this is hardened tool steel containing an appreciable percentage of carbon in the form of graphite. The chemical analysis would show the correct amount of carbon, but not all of it is in the combined form.

Presenting a paper on this subject before the Western Metal congress in San Francisco, Feb. 16-20, B. F. Shepherd, chief metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J., purported to show some hardening irregularities in tool steel, the effect of timbre upon service life, necessity for the control of timbre, the difference in timbre in the products of several manufacturers as shown by the hardenability test developed by the author, the degree of abnormality, and that timbre exists not only in tool steel, but also in various alloy steels.

Assumption Is Misleading

It is often assumed that a 100 per cent hardness inspection is a guarantee that the accepted parts are satisfactory. As a matter of fact, hardness tests only indicate that hardness at the particular location tested, and are not a guarantee that a certain quality standard is being attained. Etching a hardened tool steel part may reveal a large number of soft spots on the surface, indicating improper hardening. It is necessary, therefore, to check the uniformity of hardening by means of additional inspection of this character, if highest quality is to be maintained.

Small soft spots on the surface indicate a structural condition often more serious than ordinarily supposed. Cross sections taken through several parts having surface soft spots show that the total depth of hardening in several locations is greater than can be obtained by a normal hardening operation, and consequently indicates a hardening abnormality. This can be explained only by internal cooling stresses causing a pressure hysteresis which accelerates or retards the formation of martensite. Strains produced by such a structural condition are much more severe than those produced in a normal hardening operation and render the part unsuitable for service.

According to Mr. Shepherd, no further argument is needed to emphasize the principle that great care must be exercised in the production of high-quality work to insure that all parts have the desired structural condition in every region and on all the surface. What is called "satisfactory quenching apparatus" is not capable of reproducing the required quenching conditions.

Will Improve Product

After presenting the results of many tests made to show the difference in quality of material, Mr. Shepherd stated that development of tests to determine timbre in alloy steels is much to be desired. The use of such a test on tool steel and the purchase of tool steel with timbre as one of the main criteria of selection, rather than the present emphasis upon narrow chemical limits, will result in an improved product.

Speaking before the same session, which was sponsored by the Society of Automotive Engineers, J. M. Watson, chief metallurgist, Hupp Motor Car Corp., Detroit, presented a paper analyzing the various units of the modern automobile, giving the steel specified and its heat treatment. Although containing relatively little information not already known, this paper afforded an interesting resume of automotive steels and their most important uses.

A total of 69 steels is listed in the 1930 handbook of the Society of Automotive Engineers. Answering the question as to why so many different types of alloy steel are necessary, Mr. Watson stated that the answer lies in the fact that metallurgists have their preference from close association with steels they have worked with as well as sales efforts of various alloy companies.

The speaker suggested keeping the number of types of steel as low as possible. By doing this, a heat treating department can be planned with fewer units, inspectors become more efficient and furnace equipment has longer life as it is not necessary to change temperatures continually. Likewise, purchasing becomes more economical.

Factors which must be taken into account in the design of automotive wheels, including types for passenger cars, trucks, buses and tractors, was the subject of a paper by A. B. Domonoske, mechanical engineering department, Stanford university, Palo Alto, Calif. By means of many lantern slides, the author explained design technique and showed numerous laboratory tests made to determine the strength of wheels under assimilated service conditions. The wheels tested included cast iron, malleable, cast steel, steel disk and steel spoke types.

P. G. McVetty, research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reviewed progress which has been made in the study of creep of metals at elevated temperatures. The study of this problem has been under way for several years and is of particular importance in power plant and oil refining industries.

A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., Hartford Conn., told of some investigations which have been made in his company's plant in connection with machinability of metals used in the manufacture of gages and aircraft engine parts. The paper dealt particularly with chemical compositions, heat treatments, metal structure and hardness. An interesting statement made by Mr. d'Arcambal was that some engine cylinders which had been blasted with steel shot for cleaning purposes had become so work hardened that machining was impossible. It was found necessary to pickle and sand blast to eliminate this difficulty.

Cites Causes for Failure

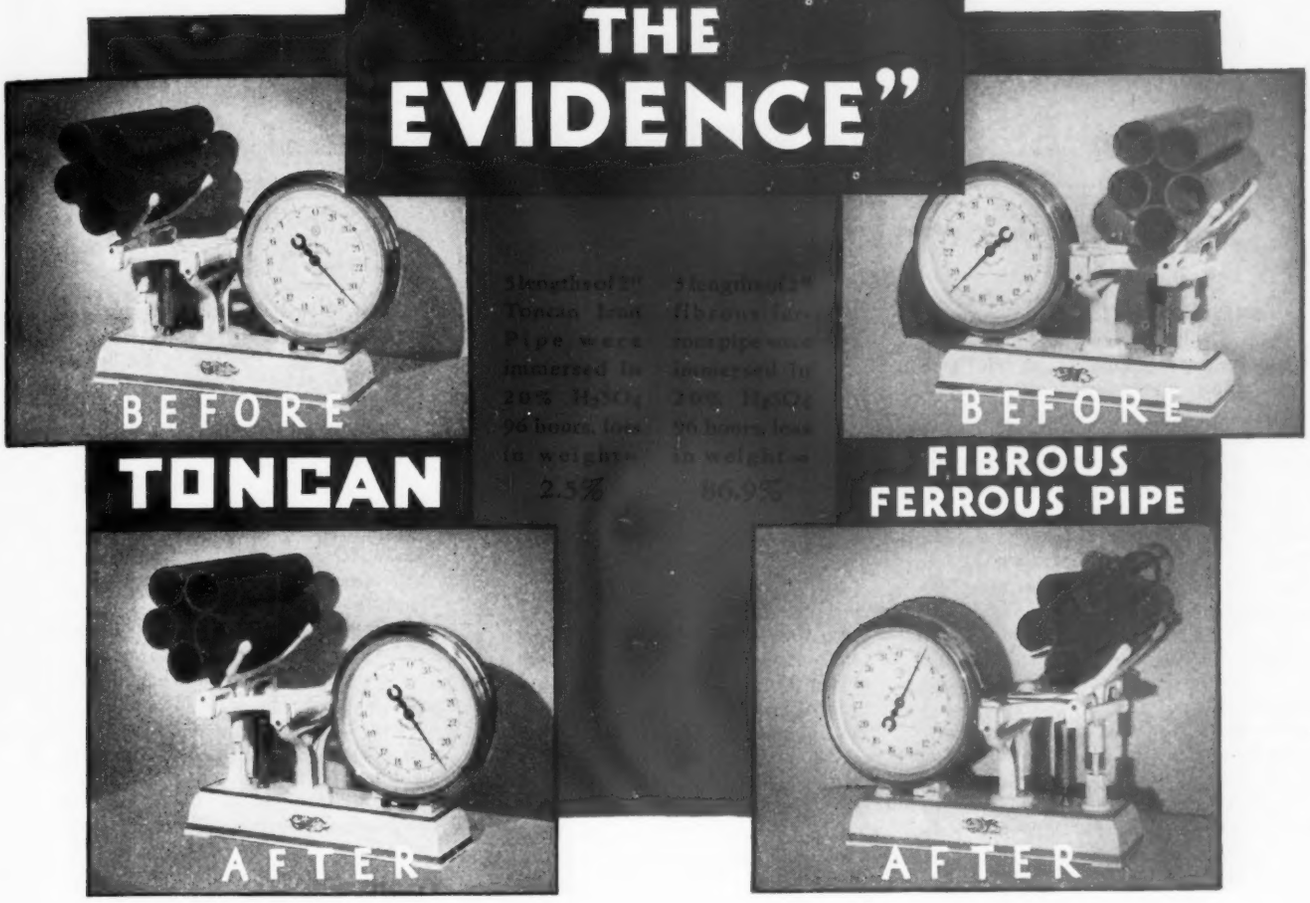
Failure of machine parts was discussed at length in a paper presented by L. T. Holt, consulting physical metallurgist, Seattle, the author pointing out that no two failures can be attributed to the same cause, except when the design itself is at fault. Too frequently the disposition is to blame fatigue for failure, when the fault is improper heat treatment or manufacturing methods. Common causes for failure are notch fatigue, corrosion, insufficient heat treatment and tool marks.

Much of Mr. Holt's paper was devoted to the cracking of steel parts as a result of nonmetallic inclusions, improper fillets, tool marks left by hogging cuts or poor machining operations. Numerous lantern slides were shown to illustrate how failure could easily be traced to all of these sources.

Corrosion of lubricated valves is a serious problem, unless proper precautions are taken, according to George F. Scherer, director of research, Merco Nordstrom Valve Co. Inc., New York, who submitted a paper on this subject. Valves usually are lubricated by a pressure system and it is imperative that the valve be so designed that the lubricant reach all parts requiring lubrication. Furthermore, lubricants must be chosen wisely to resist chemical action with the liquids or gases passing through the valves.

One session of the congress was sponsored by the American Institute of Electrical Engineers and the Paci-

"WEIGHING THE EVIDENCE"



In and around mines, quarries and industrial plants where acid, and particularly sulphuric acid bearing water or process liquors are encountered, Toncan Iron Pipe has made for itself an enviable reputation, giving many times the useful life of other ferrous pipe in the same service.

Confirmation of the longer life expectancy of Toncan Iron where acid corrosives are present is within the reach of everyone interested. While it is true that results of accelerated tests indicate only resistance to solution, the behavior of Toncan in comparison with that of other ferrous materials, is such that its longer service life may readily be surmised.

Toncan Iron is an alloy of refined iron, copper and molybdenum. Its resistance to corrosion is uniform throughout the metal. It cuts, bends, threads, flanges and Van Stones easily due to its homogeneous character.

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fic Coast Electrical association. Two papers were read at this session, one dealing with the use of electricity in the steel mill and the other the use of electricity in the heat treatment of steel.

The first paper, prepared by G. E. Stoltz, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., dealt particularly with mill motor drives, while the second, read by G. W. Bernhard, industrial engineer, Pacific Gas & Electric Co., San Francisco, discussed the application of electric heat and by lantern slides showed a number of typical electrical heat treating installations.

New Alloy Steels Are Important Aids in Combating Corrosion Evil

CORROSION of ferrous metals is one of man's greatest enemies and in recent years much effort has been expended in determining how corrosion takes place and how it can be overcome in the choice of materials and protective coatings. A most complete review of this subject was afforded in a paper presented by V. V. Kendall and F. N. Speller, research department, National Tube Co., Pittsburgh, at the Western Metal congress in San Francisco, Feb. 16-20.

In presenting the paper, Mr. Speller showed a number of charts revealing the corrosion rates of various ferrous metals. He pointed out the use of corrosion-resisting steels within their limitations and the proper application of protective coatings was doing much to reduce losses. Soil corrosion has been a particularly troublesome problem because of the great variation of conditions affecting the rate of corrosion.

Chromium and chrome-nickel steels, commonly known as heat, acid and corrosion-resisting steels, were discussed in a general way in a paper prepared by C. C. Snyder, research department, Republic Steel Corp., Massillon, O. The chemical compositions of these steels, their physical properties and applications were chief considerations.

Requires Further Study

In discussing Mr. Snyder's paper, Mr. Speller commented favorably upon the 18 per cent chromium, 8 per cent nickel steels, only recently available commercially, but pointed out that something must be done to make them more stable at high temperatures. These steels retain all their physical properties when temperatures do not go above 1200 degrees Fahr., but when the temperature rises to 1300 degrees the ductility of the steel is seriously affected. He expressed confidence that this difficulty would be solved.

In the assembly of large water wheels, powerful machinery is required to attach the large buckets by bolts. In the past, common practice has been to use C-type presses which would push the bolts into their holes, or push them out in case of dissembly. However, the tendency of the bolts to expand when subjected to the compressive pressure of the press made the finding of other means desirable. The design of a high-pressure hydraulic jack which pulls the bolts through the holes was accomplished and the construction was described in a paper read by George H. Bragg, Pacific Coast Gas & Electric Co., San Francisco.

Parts Made of Alloy Steel

To reduce weight as far as possible, alloy steels of high strength were employed in the press parts, much of the material being S.A.E. 3400 steel. The jack is capable of exerting a pressure of 300 tons and the ram has a 24-inch stroke. In operation the jack is suspended from an overhead crane, the bolt is started through the hole and threaded into the end of the ram. In the pulling of the bolt through the hole, the reaction between the water wheel and jack is taken up by a cast-steel cylindrical adapter placed around the ram and between the jack and wheel. Hydraulic pressure is obtained by pumping oil into the jack cylinder against the ram piston. In a similar manner, bolts are pulled out in case of replacing buckets on the wheel. Since the tendency of the bolt is to elongate during the pulling operation, giving greater clearance in the hole, assembly operations have been simplified greatly.

Manufacture of seamless steel tubing and some of its properties was the subject of a paper contributed by H. E. Passmore, operating engineer, National Tube Co., Pittsburgh. Considerable interest attached to this paper, which described the processes by which steel billets are pierced and rolled into tubing up to 10¾ inches outside diameter. The latter part of the text reviewed the chemical and physical properties of seamless tubing.

In a most interesting paper, H. L. R. Whitney, chief engineer, piping and pressure vessel division, M. W. Kellogg Co., New York, discussed seamless rolled steel cylinders applied to pressure vessels and penstock construction. The speaker described not only the methods of rolling these heavy parts, but he touched upon the processes of welding used in fabrication of the completed tanks which are used principally in water power and oil refinery installations. Rigid tests have been conduced to determine the strength of vessels made in this manner and all have proved satisfactory. Recently several large tanks were tested to destruction and in all cases failure occurred far beyond stresses which must be met in actual service.

Ferroalloy Briquets Aid Foundry Practice

Ferroalloy briquets are being placed on the market by Electro Metallurgical Sales Corp., 30 East Forty-second street, New York. The first ferroalloy to be briquetted is ferrosilicon which is being manufactured in cylindrically shaped briquets in two weights, 2½ and 5 pounds. The ferrosilicon briquets are for use in gray iron and high-test iron foundries; their use being intended to permit foundrymen to use a larger percentage of steel scrap and return iron scrap in cupola charges.

By means of flux in these briquets the silicon does not undergo oxidation but passes down into the melting zone where it is combined with the iron. The silicon briquets are intended to enable foundrymen to obtain from cupolas iron which is strong and at the same time readily machinable. At the same time the silicon briquets are low in carbon, phosphorus and sulphur content so that the resulting cast iron is freer from impurities. The briquets being of uniform size and analysis enable foundrymen conveniently to add the proper amount of silicon per charge.

Electro Metallurgical Sales Corp. now is preparing to extend this idea to other ferroalloys and intends to place on the market in the near future manganese, chromium and other alloy briquets.

Issues Data on Alloys

A compendium of information covering the fabricating, mechanical, physical and chemical properties of all of the commercially-available metallic alloys required by engineers, chemists and technicians in the design of equipment for modern processes, has been issued in tabular form by the American Society for Testing Materials, 1315 Spruce street, Philadelphia. Range of materials includes the chromium, chromium-nickel and other special steels, nickel and the high-nickel alloys, brasses and bronzes and other copper alloys, aluminum alloys, etc., representing the standard products of 44 manufacturers. The data are available in the form of 11 large tables in a special binder at $1.50 a copy.

New Pickling Method Gives Thorough Scale Removal

INCREASING use of alloy steel has brought with it new problems in scale removal and pickling. The complicated scale which forms on chrome-nickel steel requires concentrated pickling solutions of a rather complex nature for its removal by ordinary pickling processes. Acids necessary to remove this scale attack the base metal with high metal loss.

To overcome this difficulty several new methods have been developed. One of the most recent is the Hanson-Munning bright-dip method, developed by the Hanson-Van Winkle-Munning Co., Matawan, N. J. This company has set up an experimental plant in its laboratory where several public demonstrations of this scale removing method have been held. The process, however, has passed the experimental stage and several fully automatic commercial units are now in successful operation.

Two Tanks Provided

The process consists essentially of two dip tanks both equipped for electrolytic action. The first tank contains an acid solution which is maintained by means of a steam coil at a temperature from 120 to 150 degrees Fahr. From electrodes to the work a current of 100 amperes per square foot of surface to be cleaned is maintained in this tank, at a pressure of 6 volts. The second tank contains another acid solution which is maintained at a temperature slightly lower than that of the first bath. The current in the second bath flows from the work to the electrodes and is 150 amperes per square foot of surface with the pressure at 6 volts. Electrodes are of an insoluble lead composition. Auxiliary tanks are provided for rinsing, neutralizing and for the removal of any grease encountered.

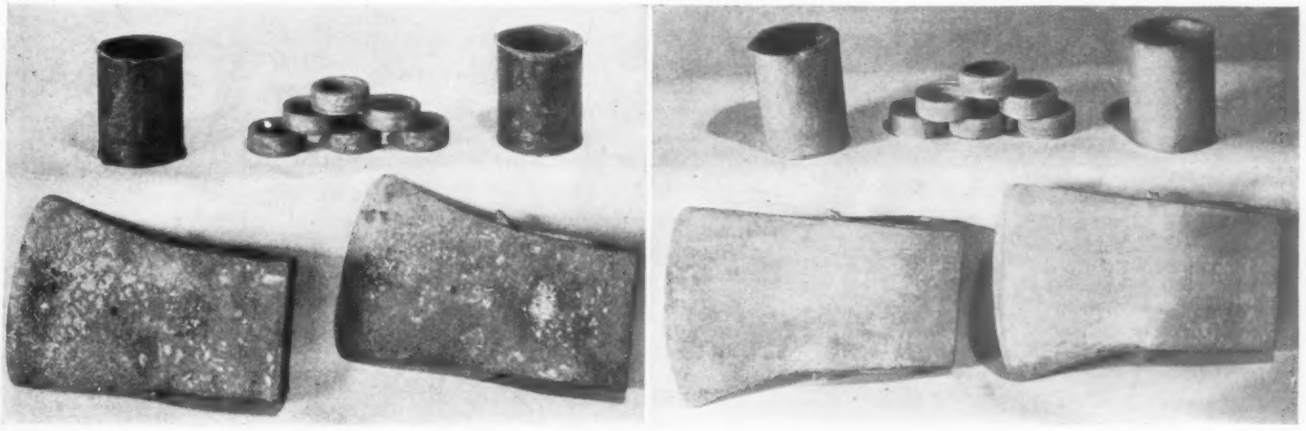
For light scale the entire sequence takes under 5 minutes compared with from 20 to 30 minutes for the usual pickling process. The operation is as follows: If oil and grease are present the work is first held for 30 seconds in an alkaline cleaner; then follows in sequence a quick immersion in a water rinse, a 3-minute immersion in the first bath, a water rinse, a 1-minute immersion in the second bath, a water rinse, a sodium carbonate neutralizing rinse, and a final water rinse. For heavier scale the time of immersion in the acid solutions is increased. Heat treated alloy forgings with resistant scale may require from 5 to 10 minutes in the first bath and from 1 to 2 minutes in the second.

Method Is Effective

Parts which have passed through the process are bright and thoroughly clean. Even deep pores and crevices are free from scale. One of the many tests made by the company to demonstrate the effectiveness of the new method of cleaning was to take two identical automobile bumpers and to clean one by the ordinary pickling process and the other by the new method and then nickel plate both and submit each to similar severe service. It is claimed that the life of the plating on the bumper cleaned by the bright-dip process was four or five times the life of the other bumper.

Although no deposit is made on the parts which are cleaned, the new process is said to provide increased resistance to rusting compared with ordinary pickling methods. The theory back of the actual cleaning by the improved method is that the scale oxides are reduced quickly to carbides in the first bath and in the second bath an unstable acid is formed which with outward flowing current throws off the carbides.

TWO sections of butt welded pipe, six forged alloy steel ball races and two forged steel axes, before pickling in the electrolytic cleaning solutions (left); and the same items after the solution treatment (right)



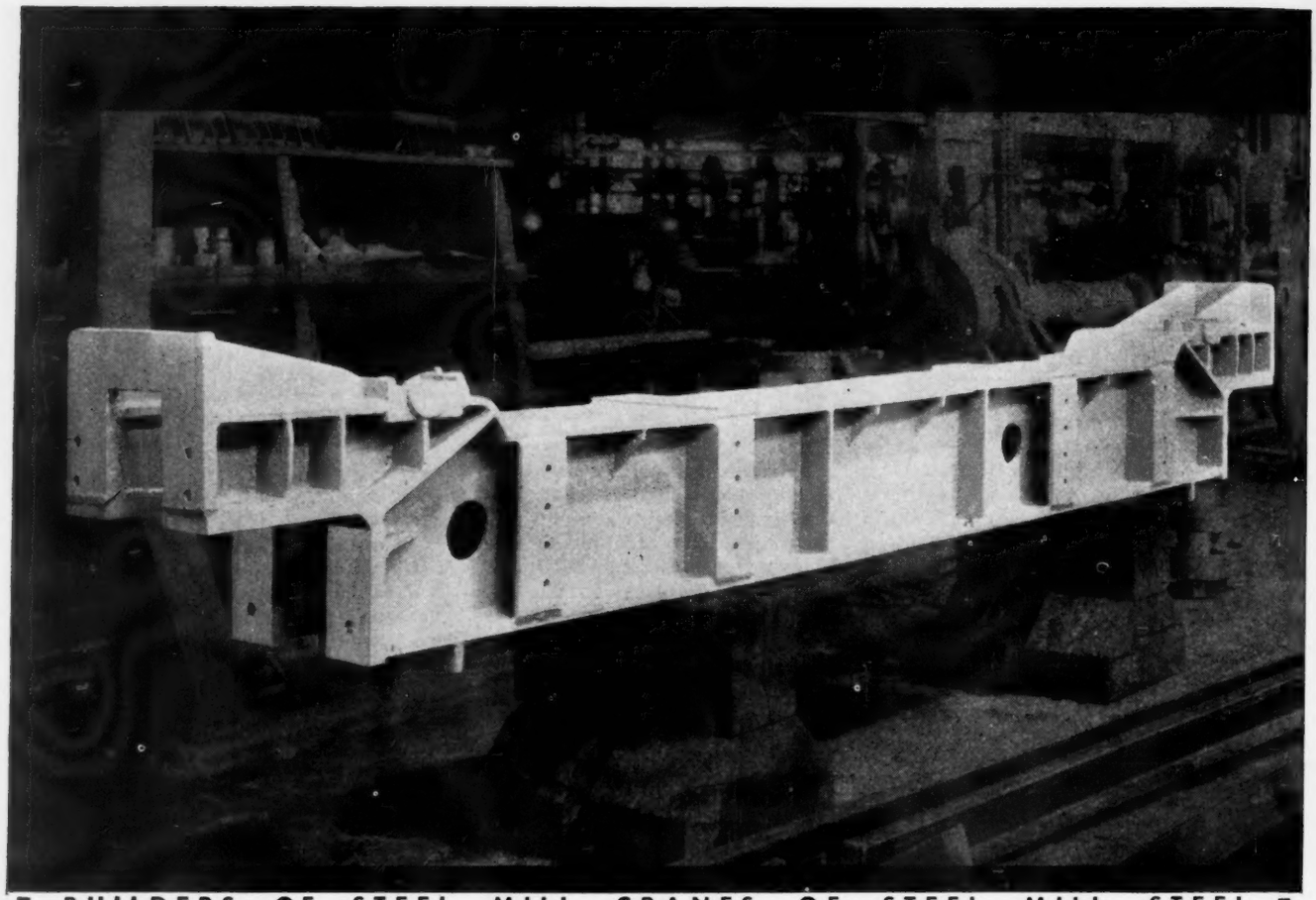
Cleveland Company Prepares Fourth Welding Chart

Williams & Co. Inc., metal warehouse operator and distributor of welding supplies, Cleveland, has published its fourth annual welding chart giving more complete and revised information. This chart, 20 inches high and 27½ inches wide, is suitable for wall mounting for quick reference. It lists 30 brands of electric and gas welding wire and briefly indicates the sizes, welding currents, specifications and applications.

In addition, the chart presents considerable general welding information, such as causes of bad welds, precautions for good welds, data on penetration and recommended practice for welding pure nickel and monel metal. Copies of the chart are available upon request to the Williams company, which is located at 1748 East Twenty-second street, Cleveland.

Picks Two Committees in Malleable Division

Two committees have been appointed in the malleable division of the American Foundrymen's association. The first will be known as the committee on preparation of a malleable iron handbook and the other as the subcommittee on development of specifications for malleable iron fittings. Scott Mackay, associate professor of metallurgy, University of Wisconsin, Madison, Wis., has been named chairman of the former committee and H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, is chairman of the latter group.



■ BUILDERS OF STEEL MILL CRANES OF STEEL MILL STEEL ■

CLEVELAND welded rolled steel end trucks replaced cast steel end trucks which failed in service on a 10-ton, 100-ft. span, open hearth stock house crane of another make. Since 1926 Cleveland has placed in service more than 500 crane units of welded rolled steel construction.

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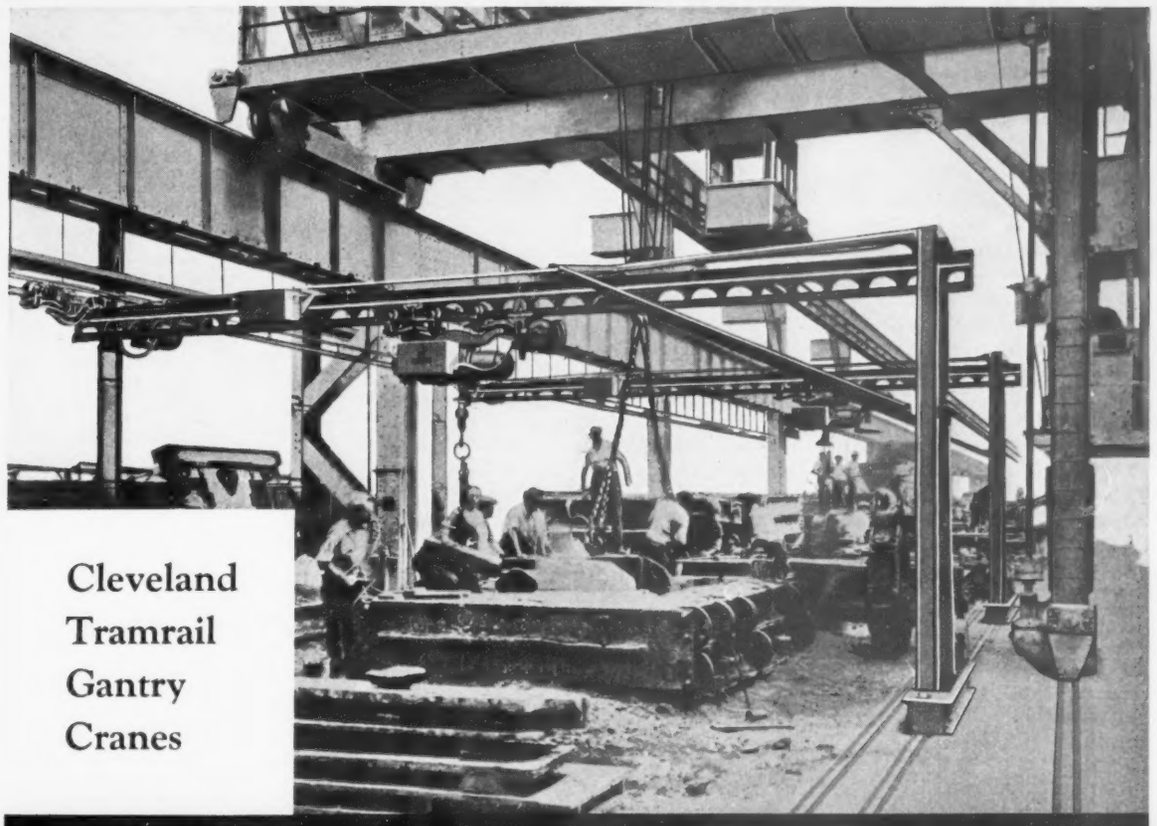

Cleveland
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Gantry
Cranes

Helpers for the Big Boys

Light Weight Easily Hand/Electric Propelled

Yes, there are many times when the "big boys" the overhead cranes need a helper; When they are busy with the heavy loads - and someone on the assembly floor, on the molding floor or in the pit has a lighter lift to make - that is where the helper "A Cleveland Tramrail Gantry Crane" steps in. Remember profits shrink when production waits on a crane. The Tramrail Gantry [one machine tool builder installed a Gantry for each assembly man] makes it possible to avoid this delay. There are other places where a Tramrail Gantry is all that is required.

CLEVELAND ELECTRIC TRAMRAIL

Division of

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Atlanta, Ga.	Chicago, Ill.	Easton, Pa.	Johnstown, Pa.	Mobile, Ala.	Philadelphia, Pa.	Sheboygan, Wis.	Toronto, Ont.
Baltimore, Md.	Cincinnati, Ohio	East St. Louis, Ill.	Joliet, Ill. (See Rockford)	Montreal, Que.	Pittsburgh, Pa.	South Bend, Ind.	Trenton, N. J.
Birmingham, Ala.	Cleveland, Ohio	Elizabeth, N. J.	Kansas City, Mo.	Muskegon, Mich.	Portland, Oregon	(See Muskegon, Mich.)	Tulsa, Okla.
Brooklyn, N. Y.	Columbus, Ohio	Erie, Pa.	Knoxville, Tenn.	Nashville, Tenn.	Providence, R. I.	Springfield, Mass.	Wilmington, Del.
Buffalo, N. Y.	Dallas, Tex.	Evansville, Ind.	Los Angeles, Calif.	New Haven, Conn.	Richmond, Va.	(See New Haven)	Worcester, Mass.
Camden, N. J. (See Trenton)	Davenport, Iowa	Fort Wayne, Ind. (See Toledo)	Louisville, Ky.	New Orleans, La.	Rochester, N. Y.	St. Louis, Mo.	York, Pa.
Charleston, W. Va	Dayton, Ohio	Hagerstown, Md.	Memphis, Tenn.	New York, N. Y.	Rockford, Ill.	Syracuse, N. Y.	Youngstown, Ohio
	Denver, Colo.						

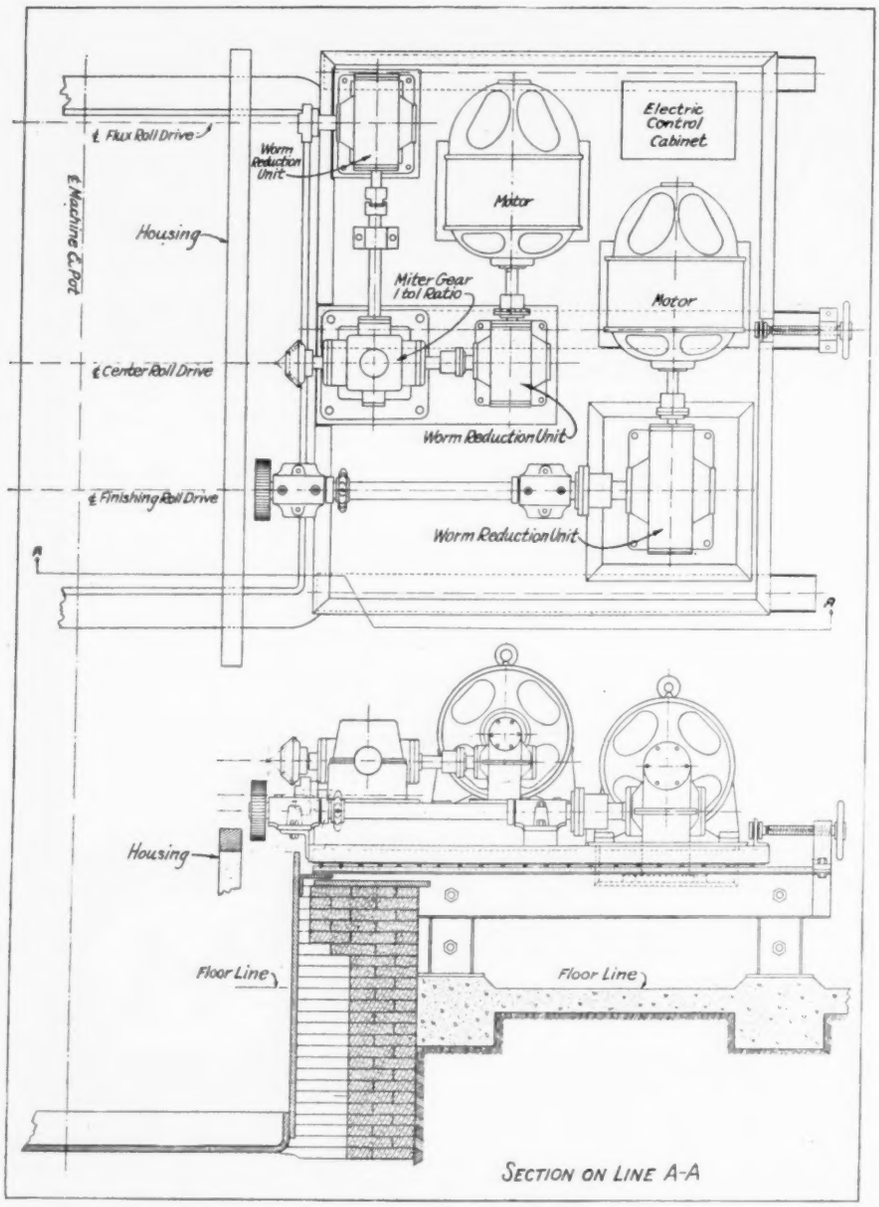
CLEVELAND

HAND OR ELECTRIC TRAMRAIL

Drive for Galvanizing Pot Eliminates Roll Chatter

INTERMITTENT action of galvanizing finishing rolls due to chatter and backlash has interfered in the past with uniform coating. This tendency to coat unevenly due to interrupted action of the finishing rolls has been particularly noticeable when depositing heavy coatings at low speed.

To overcome this disadvantage without losing the benefits of speed regulation, the 2-motor drive shown in the accompanying illustration has been developed by the Wean Engineering Co. Inc., Warren, O. In this apparatus one motor is direct-connected through a flexible coupling to a worm drive reducer, the low-speed shaft of which is extended to drive the finishing rolls. By eliminating all change gearing between motor and finishing roll drive, backlash resulting in intermittent action of the final coating rolls is eliminated entirely. To provide the necessary speed changes a second motor is direct-connected through a worm reducer and a bevel gear transmission to drive the center and flux rolls of the galvanizing machine. Speed regulation of the flux and center rolls with the finishing rolls is effected by special electrical control, permitting speed adjustments between the motors in fine increments while the control prevents any deviation from the speed setting when it is once established. Thus, the 2-motor galvanizing drive, while providing smooth uninterrupted final roll action through a final worm and worm wheel drive, also offers close speed regulation.



Improved galvanizing machine drive which is equipped with two motors and affords speed adjustment of redressed finishing rolls

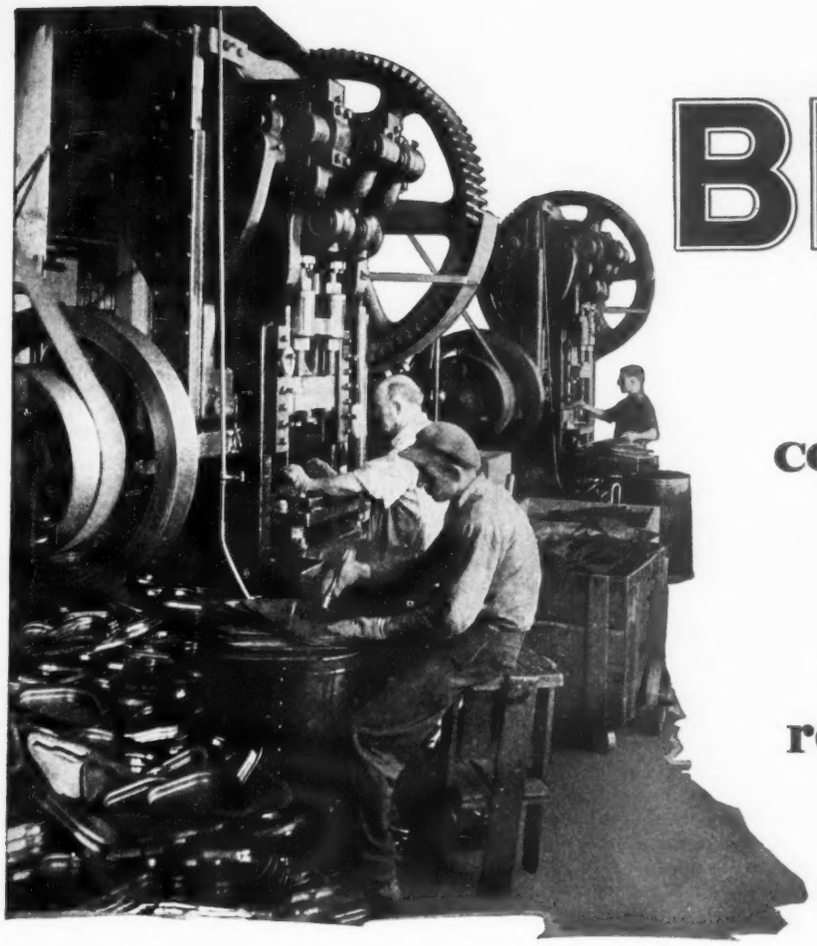
Single Drive Feasible

In plants where power conditions are not favorable to the installation of the 2-motor drive synchronized control, a single-motor drive having all the advantages of the 2-motor drive has been developed. A 15-horsepower motor having coupling extensions on both ends of the armature shaft is located between two worm-type reduction units, one of which drives the final finishing rolls in the same manner as that employed in the double-motor drive. The other end of the armature shaft is direct-connected to a second worm-type reducer, the low-speed shaft of which connects to a positive infinitely variable-speed transmission made by the Link-Belt Co., Chicago. The driven shaft of the variable-speed transmission is connected directly to a bevel-gear reduction unit, the extended shaft of which drives the center rolls while an angular extension shaft drives a third worm-gear reducer which in turn drives the entering or flux rolls.

Speed adjustment for various diameters of the finishing rolls is effected through the infinite variations made possible by the variable-speed transmission; that is, as the final galvanizing rolls are reduced in diameter, a corresponding reduction in the speed of the center and flux rolls is effected through the variable-speed transmission unit.

Lines Steel Tubing with Nonferrous Metals

A new method of lining steel tubing with a variety of metals or alloys has been announced by the Detroit Seamless Steel Tubes Co., Detroit, which has secured exclusive patent rights to the process. In combining the inner lining metal with the outer steel shell the two are bonded by fusion so inseparably that there is no evidence of separation and no manual means of destroying the union, according to the manufacturer. Centrifugal casting under heat insures uniform distribution of the lining material on the periphery to the extent that only the minimum of machining is necessary, thus reducing finishing costs to a point far below methods now employed. Among the lining ma-



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No. 565

terial already successfully used are bronze, copper, tin and other nonferrous metals. Practically every kind of bearing bronze can be used.

Manufacturers with proper shop equipment can stock the lined tubes in lengths up to 16 feet ready for screw-machine departments and thus be enabled to readily produce bearings of varying lengths but with the same outside and inside diameters from one length of tubing. Through this manner of handling, manufacturers will be in a position to reduce their finished stock to the minimum.

Other practical uses to which tubing so lined may be put cover a wide range, among them tubes lined with noncorrosive metals for conveying liquids whose chemical properties deteriorate steel; tubes used in water tube boilers where a lining metal of high-heat conductivity is advantageous; and water pipes where strength is a desirable factor.

Plan Welding Symposium

Lehigh university, Bethlehem, Pa., will hold its annual welding symposium, March 27. Included among speakers will be J. C. Hodge, Babcock & Wilcox Co., Barberton, O., who will discuss recent improvements in welding processes. In addition to the usual demonstrations of all the different methods of welding, a demonstration of the testing of welds by gamma rays will be conducted.

Management, Maintenance, Materials Handling on Industrial Congress Program

ANNOUNCEMENT has been made of program details for the National Industrial congress, to be held in Public auditorium, Cleveland, in conjunction with the second National Industrial Equipment exposition, April, 13-17. Meetings held four days of the congress will feature subjects pertaining to management, maintenance and materials handling, and are under the auspices of the Society of Industrial Engineers, American Society of Mechanical Engineers, American Management association, Cleveland Engineering society and the Cleveland Electrical Maintenance Engineers association.

The first similar congress was held four years ago in Philadelphia; the second in Detroit and the third in Chicago. Last year at the Chicago meeting, known as the National Management congress, the first expostion was arranged in conjunction with technical sessions.

Included on the list of technical papers are the following, listed according to the day scheduled for presentation:

Monday, April 13

"Handling of Thin Sheet Scrap in Tin Plate and Sheet Steel Mills," by H. H. Giles, American Sheet & Tin Plate Co., Monessen, Pa.

"Handling of Automobile Body Scrap," by R. R. Reese, plant engineer, Packard Motor Co., Detroit.

"Briquetting of Cast Iron Borings and Steel Turnings," by A. K. Nowak, Baldwin Southwark Co., Chicago.

"Segregation and Control of Waste," by C. H. McKnight, supervisor of inventory control, General Electric Co., Schenectady, N. Y.

"Waste Campaign Experiences and Suggestion Systems," short talks by representatives of several companies.

Tuesday, April 14

"Monorail Handling of Materials," by C. W. Preston, Majestic Household Utilities Co., Chicago.

"Engineering Factors in the Use of Electric Hoists," by H. J. Fuller, consulting engineer, New York.

"Bulk Handling Methods for Pipe," by E. W. Burgess, A. O. Smith Corp., Milwaukee.

Wednesday, April 15

"Synchronization of Production Control and Conveyorization," by E. M. Olin, works manager, Westinghouse Electric & Mfg. Co., Mansfield, O.

"Materials Handling for Mass Production at the General Electric Plant," by H. C. Rundle, General Electric Co., Schenectady, N. Y.

"Application of Two-Speed Motors to Electric Hoists," by G. E. Schirmer, Robbins & Myers Inc., Springfield, O.

"Handling Equipment for Bulk Materials," by Arthur F. Case and Paul M. Douglas, Wellman Engineering Co., Cleveland.

"Variable Speed Transmission for Materials Handling," by D. W. Clem, Reeves Pulley Co.

"Types of Materials to Use in Materials Handling Equipment," by Harvey Skinner, consulting engineer, Boston.

"The Use of Gas Trucks and Tractors in Materials Handling," by G. E. Hagemann, editor, Alexander Hamilton institute, New York.

Thursday, April 16

"Departmental Analyses and Wage Incentives," by W. G. Uhlir, consulting engineer, Harvey, Ill.

"The Control of Nonproductive Costs," by Harry W. Benton, plant engineer, Pratt & Whitney Co., Hartford, Conn.

"Organization and Operation of Electrical Maintenance Department," by Sidney Watkins, chief electrician, Warner & Swasey Co., Cleveland.

"Automatic Electric Control of Materials Handling," by J. E. Wood, Monitor Controller Co., Cleveland.

"Handling Small Packages in the Shop," by C. A. Fike, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Maintenance of Electric Cranes and Hoists," by Robert W. Walton, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

"Tools for the Maintenance Engineering Department," by T. A. Keefer, National Cash Register Co., Dayton, O.

"Weighing and Counting Devices Used on Material Handling Equipment," by A. B. Jacobus, Fairbanks Co., New York.

Nondestructive Testing Is Topic at Joint Meeting

Nondestructive tests of welds were discussed at the joint meeting of the New York section of the American Welding society and the New York chapter of the American Society for Steel Treating, March 9, at the Engineering Societies building. J. J. Crowe, Air Reduction Sales Co., New York, presided.

"X-Ray Inspection of Welds" was the subject of a paper presented by Dr. Ancel St. John, St. John X-Ray Corp., New York. Included in this discussion were methods, apparatus and results, as well as a resume of important applications.

Magnetic inspection of steel was covered in a paper by Dr. A. V. deForest, Welding Engineering & Research Corp., New York, in which a review was presented of outstanding developments in the use of magnetic testing in industry.

A third type of nondestructive testing, comparatively new, known as gamma-ray inspection, was discussed as applied to the inspection of heavy welded structures, by Dr. R. F. Mehl, Naval Research Laboratory, Anacosta, Md.

Steel Founders Will Devote Time to Sales Problems

Steel Founders' Society of America will meet at the Neil house, Columbus, O., March 19 to 20, general sessions and meetings of special divisions being scheduled for the first day, while the second day will be devoted to a discussion of the industry's sales problems.

This sales meeting, in charge of E. St. Elmo Lewis, national authority on merchandising and sales promotion, will attract upward of 300 steel castings salesmen and sales managers, it is expected.

John J. Baum, engineer and metallurgist, will address the small castings division on "New Uses for Cast Steel." Professor W. Trinks, Carnegie Institute of Technology, Pittsburgh, will speak on "The Selection of Materials in Machine Design."

Addresses Foundrymen

An address entitled "Research as Business Insurance" presented by Dan M. Avey, editor, *The Foundry*, Cleveland, before members of the Philadelphia Foundrymen's association, Wednesday evening, March 11, at the Manufacturers' club, Philadelphia.

New Books Worth Reading

SCIENCE ◆ ECONOMICS ◆ BUSINESS

Germans Discuss High Quality in Castings

Edelguss, edited by G. Meyersberg, paper, 170 pages, 6 x 9 inches, published by Julius Springer, Berlin, Germany, and supplied by STEEL, Cleveland, for $3.25, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London.

Refined castings, or the term more familiarly used in this country, high quality castings, in this volume refer particularly to gray iron. The volume is composed of 23 articles, most of them previously published, by prominent German metallurgists and foundrymen, including such names as Jungbluth, Maurer, Sipp, Bauer, Emmel, Piwowarsky, Roll, and Klingewstein. Articles by one Englishman and two Frenchmen are included.

The chapters, as may be expected, are devoted mainly to discussions centering around gray irons with a pearlitic structure which have received considerablo prominence in Europe and Great Britain. The book is divided into three sections. The first deals with high quality iron in general; the second with improvement of gray iron through producing a pearlitic matrix, by reduction of graphite content, and dissemination of graphite in fine particles; the third contains articles on resistance qualities.

◆

Problems of Industry in Building Trades

Industrial Relations in the Building Industry, by William Haber; cloth, 593 pages, 6 x 9 inches; published by Harvard University Press, Cambridge, Mass.; supplied by STEEL, Cleveland, for $5, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 25s, postage extra.

A Wertheim Fellowship publication, the third of the series, this work presents much material of interest to economists, students of industrial relations, contractors, architects and labor specialists. The author has investigated in various of the larger American cities the environment which has influenced the organization and leadership of labor unions and employers' organizations and has made their policies what they are. He has sought beneath the surface the background out of which the complex problems of the building industry arise. His analysis takes into account the elements of instability and methods thus far developed for controlling them.

Relation of the industrial problems to technical changes now taking place is traced and the elements are presented out of which a more stable industrial relations policy can be evolved.

◆

Telephone Selling as Aid to Business

Selling by Telephone, by J. George Frederick; cloth; 339 pages, 5¼ x 8 inches; published by the Business Bourse, New York; supplied by STEEL, Cleveland, for $4, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 20s, postage extra.

The author bases the value of this work on the office of the telephone as an instrumentality in reduction of distribution cost in this era of hand-to-mouth buying. Proper planning and use of the telephone in selling greatly extends the field of the seller and saves much time and money, contributing to a large total of small sales, achieved in a minimum of time.

The subject has been gone into exhaustively and every phase has been investigated and analyzed. Research among users of telephone selling has been undertaken and the results have been embodied in his conclusions, many specific experiences being adduced.

The volume represents the results of pioneering in a field relatively new. It contains the salient facts of material heretofore published on this subject, supplemented by results of the author's own investigations and is offered as a study of this new form of selling, subject to improvements and further investigation. A code of telephone salesmanship represents a pioneer effort.

Methods are outlined for procedure by various types of selling, department stores, small retailer, wholesaler and retailer, financial houses, newspaper advertising, collections and other departments.

An accompanying map of the United States shows keytowns and districts best reached from them in telephone campaigns.

Standards of Testing Society Are Issued

Standards of the American Society for Testing Materials, 1930, in two volumes, Part I—Metals and Part II —Nonmetallic Materials, 1000 and 1214 pages respectively, 6 x 9 inches, cloth or half leather, published by the American Society for Testing Materials, Philadelphia, supplied by STEEL, Cleveland, for $7.50 for each volume singly or $14 for both parts in cloth; half leather, $9 each volume singly or $17 for both parts, postage 15 cents per volume extra; in London by Penton Publishing Co. Ltd., Caxton House, Westminster, for 37s 6d and £3 10s for cloth and £2 5s and £4 5s for half leather, postage extra.

Every three years the American Society for Testing Materials issues its new edition of authoritative standards for engineering materials. Part I on metals contains 179 standards covering steel, wrought iron, pig and cast iron, ferroalloys, nonferrous metals, and miscellaneous subjects. Part II on nonmetallic materials contains 251 standards on cement, lime, gypsum, concrete and aggregates, brick, refractories and tile, preservative coatings, petroleum products and lubricants, road materials, waterproofing and roofing materials, rubber products and insulating materials, textile materials, and coal, coke, timber and miscellaneous materials.

◆

German Work Presents Metallographic Data

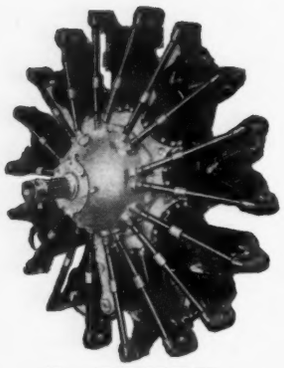
Atlas Metallographicus, by Hanemann and Schrader, sections 3, 4 5, 6, 7, 8 and 9; paper; 7½ x 10¾ inches; 48, 32, 32, 32, 32, 32, and 48 pages respectively; published by Gebrueder Borntraeger, Berlin, Germany, and supplied by STEEL, Cleveland, for $14.50 plus 15 cents postage for the seven sections.

The seven sections are a continuation of a monumental work undertaken by Hanemann and Schroeder several years ago on the metallography of iron and steel. The first two sections described the various structural components such as ferrite cementite, etc., and presented micrographs to show the structures of plain forged steels of various analyses. Part 3 deals with the order of structural formation and the effect of annealing on structure formation and

THESE MIGHTY MOTORS
BY THE PRATT & WHITNEY AIRCRAFT CO.

"THE mass production of uniformly heat treated steels, in which the utmost possible dynamic strength has been developed, is at the present time regarded as the keynote of aircraft supremacy."

—Excerpt from an article in "Heat Treating and Forging" by MR. J. W. URQUHART, Metallurgist, London.

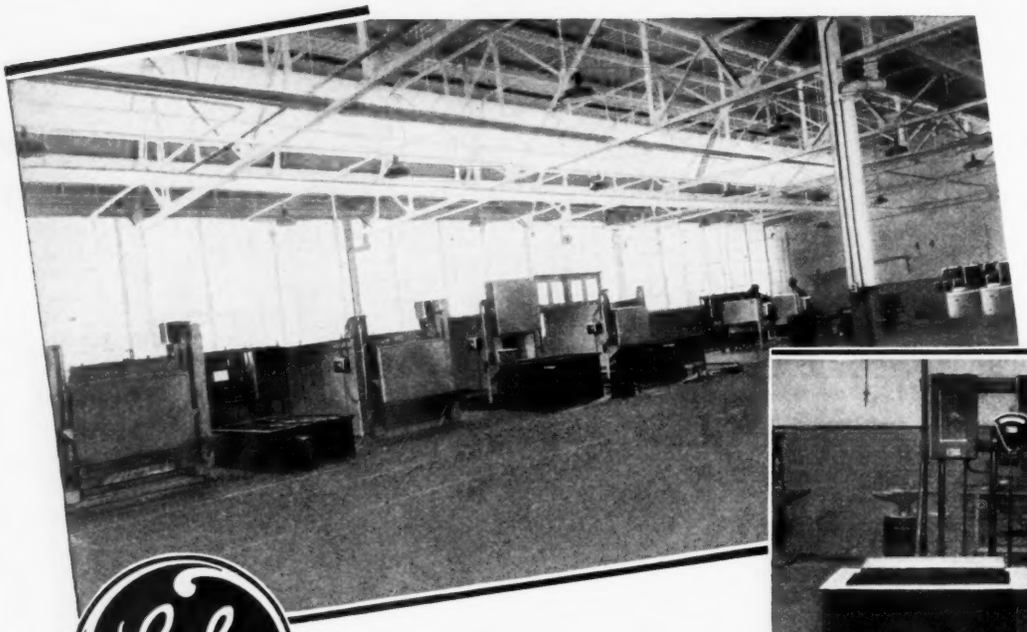


The "HORNET"
575-hp., 810-lb. wt.

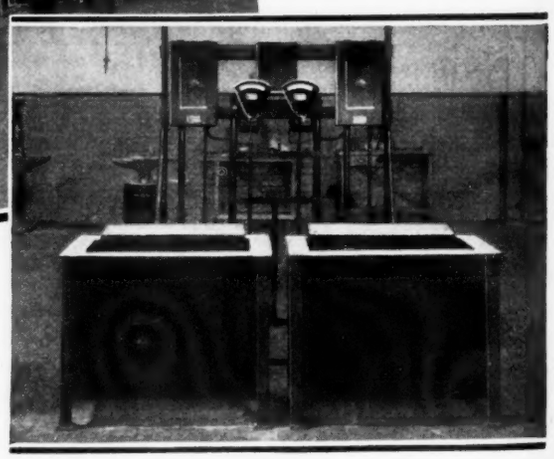
These wonderful prime movers of the air—the dynamic "Hornet" and the flashingly powerful "Wasp"—manufactured by the Pratt & Whitney Aircraft Company, owe no small portion of their mechanical excellence to the painstaking heat treatment of their parts.

To meet the demands of mass production, to insure maximum uniformity and dependability, the Pratt & Whitney Aircraft Company has installed to date six G-E box-type furnaces, two G-E lead hardening pots, and two G-E tempering baths, all equipped with G-E control gear.

Thus the processes of tempering, hardening, and toughening have been placed beyond all guesswork. Every part is uniformly treated—perfect—safe and dependable. And working conditions, too are improved.



General view, heat treating department, the Pratt & Whitney Aircraft Co., Hartford, Conn., showing G-E electric furnaces, lead pots, etc., equipped with G-E control

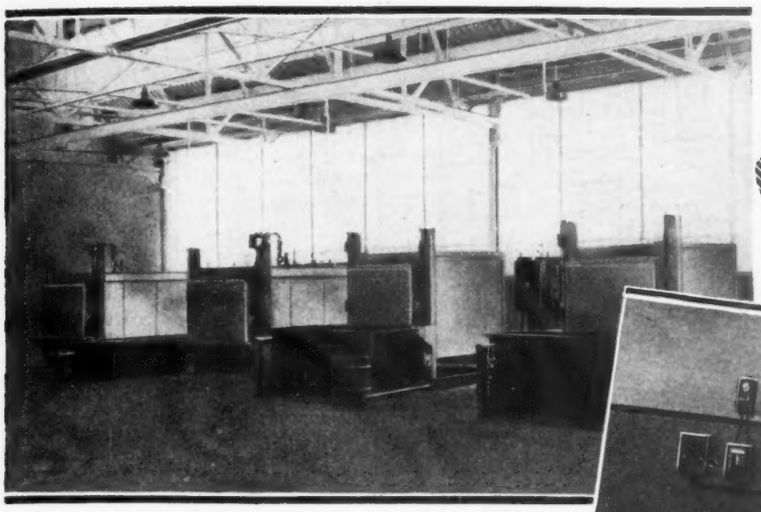


Two G-E 30-kw. oil-tempering baths, the Pratt & Whitney Aircraft Co., Hartford, Conn., equipped with G-E control equipment

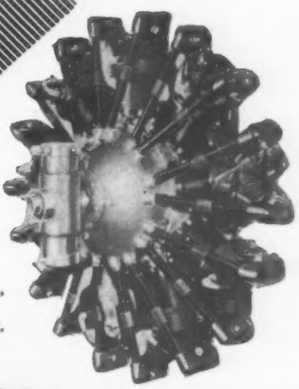
GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

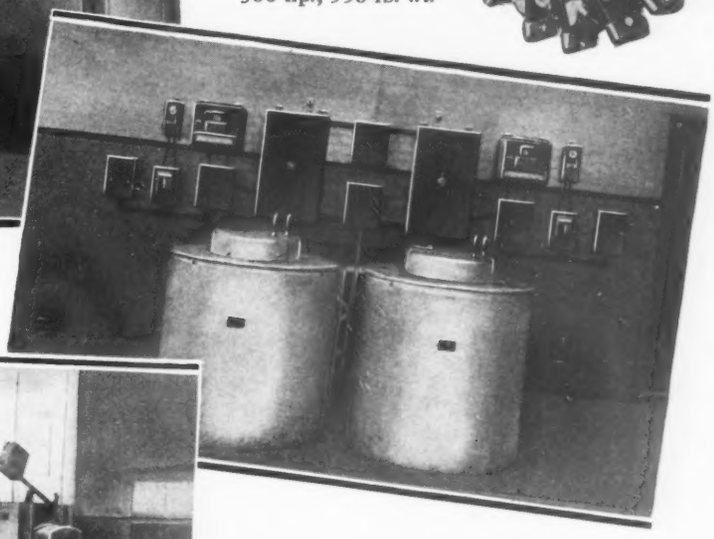
MADE SAFER More Uniform More Dependable WITH G-E ELECTRIC FURNACES



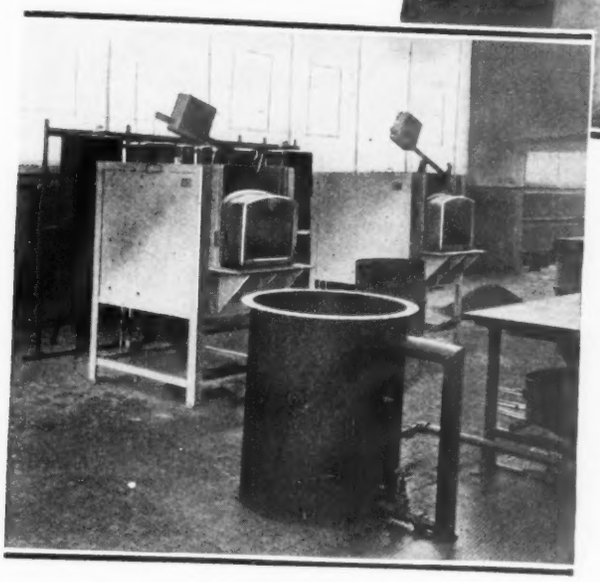
Four 72-kw. G-E box-type furnaces installed in the Pratt & Whitney Aircraft Company's heat treating department, Hartford, Conn.



The "WASP, Jr." 300-hp., 550-lb. wt.



Two G-E 16-kw. lead pots, the Pratt & Whitney Aircraft Co., Hartford, Conn.



Two 18.5-kw. G-E box-type furnaces installed in the Pratt & Whitney Aircraft Company's heat treating department, Hartford, Conn.

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SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

the whole structure. In addition to the text matter, 47 excellent micrographs are included, with tables giving data on composition, type of material, and the formations shown.

Part 4 contains 42 micrographs with descriptive matter on primary and secondary structures in unannealed steel; some structural formations in unannealed steel castings, etc. Part 5 contains 54 micrographs with explanatory tables on the Widmanstatten and coarse structures, etc. Part 6 presents 64 micrographs relating to various structures with data on the origin of network structures, secondary globular structures, etc. In Part 7 are 61 micrographs with data on the influence of heating speed with recrystallization on the net size; influence of annealing duration and temperature on the net size; structural formation of steel under the influence of carbon content and cooling speed, etc.

Part 8 contains 64 micrographs and is a continuation of Part 7. It also includes data on the influence of cooling speed on the size of ferrite crystals in net structures, the formation of cementite nets and pearlite in hypereutectoid steel, etc. Part 9 contains 64 micrographs with descriptions of the change of cementitic and pearlitic forms. The micrographs show the transformation of coarse into fine structures through recrystallization; examples of the transformation of pearlite and cementite in gamma mixed crystals by heating, etc. In addition Part 9 contains an index.

◆

Present Status of Tax Methods Is Analyzed

State and Local Taxation of Property, by National Industrial Conference Board Inc., New York; cloth, 245 pages, 6 x 9 inches; published by the board; supplied by STEEL, Cleveland, for $2.50, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 12s 6d, postage extra.

Another volume on tax matters, this is a valuable addition to the series produced by the board. With increase of governmental revenue requirements and the proportion of property that easily can evade taxation, severe strain is placed on the general property tax. Remedies have been adopted by many states to remove resulting inequalities, exemptions and special property taxes which take into account the administrative breakdown of the old system.

In this volume the status of the general property tax is analyzed, its history is traced, with administrative difficulties, and diverse methods, legal and extra-legal, by which states have adapted their tax systems to modern conditions.

Tabulations bring out the great diversity of taxing systems on various states, facilitating comparison of individual states. The volume is adapted for use as a text book or as collateral reading for students of taxation.

◆

British Engineering Practice in Compact Form

Mechanical World Yearbook, 1931, cloth, 177 pages, 4 x 6 inches; published by Emmott & Co. Ltd., 65 King street, Manchester, Eng.; supplied by STEEL, Cleveland, for 50 cents, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 1s 6d, postage extra.

An annual publication covering British engineering practice, forming a handbook on steam engines and turbines, boilers, gas oil and diesel engines, gas producers, gears, grinding, bearings, friction and lubrication, hydraulics, foundry work, screw cutting, conveyors and other subjects.

Additional sections have been given a place in the 1931 edition, bringing it up to date, while older sections have been revised in view of advances in knowledge.

◆

Sand Testing as British Foundrymen Apply It

Methods of Testing for Foundry Moulding Sands; paper, 35 pages, 6 x 9¾ inches; published by the British Cast Iron Research association, Birmingham, Eng., and supplied by STEEL, Cleveland, for $2.50, plus 15 cents postage, and in London by the Penton Publishing Co. Ltd., Caxton House, London, for 10s 6d.

As part of its research work, the British Cast Iron Research association examined available British natural molding sands and applied every scientific test that would yield information of value to users. The test methods are described in detail. Methods included are: Sampling; milling or treatment before examination; moisture content; ramming; dry sand tests; mechanical analysis, strength; permeability; expansion and contraction; and chemical analysis.

◆

Minerals in Relation to World Politics Discussed

World Minerals and World Politics; by C. K. Leith; cloth, 213 pages, 5 x 7¼ inches; published by the McGraw-Hill Book Co., New York, and supplied by STEEL, Cleveland, for $2, plus 15 cents postage, and in London by the Penton Publishing Co., Ltd., Caxton House, London, for 10s, postage extra.

This book is an important and timely contribution to the study of the relation of nations and continents to the productive reserve supplies and possible future developments of mineral resources. It presents a new perspective on the question and analyzes the consequent political reactions.

Dealing with a subject which is receiving first attention in international political and business negotiations it presents a clear picture of the mineral situation of the world as a whole and of the principal nations involved.

It considers the mineral problem in relation to the future, suggestion probable trends of economic and political policy, and laying particular stress upon their significance in relation to world peace.

The author is chairman, respectively, of the department of geology of the University of Wisconsin, of the committee on foreign and domestic mining policy of the Mining and Metallurgical Society of America, and of the Mineral Inquiry of the American Institute of Mining and Metallurgical Engineers.

◆

Growth of Industry from Earliest Days

Industrial Evolution, by N. S. B. Gras; cloth; 259 pages, 5¾ x 8¾ inches; published by Harvard University Press, Cambridge, Mass., and supplied by STEEL, Cleveland, for $2.50, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., for 12s 6d, postage extra.

The whole progress of industry in Europe and America has been surveyed by Professor Gras in a nontechnical brief history of manufacturing. He describes especially the textile, shoe, iron, chemical and electrical industries. Medieval guilds and modern associations are considered. The artistic element in industry is kept constantly before the reader. This is an element of importance at present, when the small handicraftsman is able to find increasing appreciation for beautiful and distinctive work.

Illustrations show ancient machinery and processes devised by early manufacturers, with some more modern appliances for obtaining similar results. As a history of the progress from rude beginnings to the modern age of the machine this volume has deep interest. Notes are appended to each chapter, giving sources and comments.

An address entitled "Residual Stresses" will be presented by James W. Owen, director of engineering, Welding Engineering & Research Corp., before the Philadelphia section of the American Welding society, Monday evening, March 16, at the Engineers club, 1317 Spruce street, Philadelphia.

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Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

USES:

Economics of Tungsten

World production, substitutes, occurence, markets and prices, effects of stocks, sources of new supplies and uses of tungsten, discussed by Paul M. Tyler, in Metal & Alloys, February 1931, *p.* 80, 4 *pp.*, 4 *tables.*

By far the largest use of tungsten is in the steel industry chiefly in high-speed steel and to a less extent in other steels and in magnet steels. The most discussed substitute for tungsten in high-speed steel cutting tools is molybdenum. One pound of the latter produces practically the same effect in high-speed steel as 2 to 2¼ pounds of tungsten and normally is a trifle cheaper. As yet little real economy in the use of tungsten has been effected by the use of substitutes. Substantial economy in use, however, has been brought about by designing tools in a manner such that a thin plate or tip of high-speed steel is cemented to a shank of cheaper steel. American mines have almost never succeeded in satisfying domestic needs and the deficiency has been made up by imports.

STEEL 3-12-31

FABRICATION:

Nitriding Process

Results obtained by the nitriding process, general principles on which it is based and furnaces and equipment used in its application, discussed by J. H. Cates Jr., in Machinery, March 1931, *p.* 489, 4½ *pp.*, 4 *illusts.*

Nitriding consists of heating articles made of certain alloy steels containing aluminum, chromium, molybdenum, etc., in a retort of ammonia gas at a temperature of 900 to 1200 degrees Fahr. for a period of 2 to 90 hours at various gas pressures. Steels thus treated possess many useful characteristics including extreme hardness of the case. A hardness of around 1000 brinell as compared with about 650 for the best carburized steel is obtained.

Nitrided steel has the ability to hold its hardness at high temperatures. One peculiar effect noticed in nitriding is the tendency of the work to "grow" in size due to the actual combination of the nitrogen with the elements in the steel. Nitriding at the low temperatures produces a fairly thin but hard case, while higher temperatures produce a deeper but softer case. One of the latest developments in the process is the use of an agitating fan to produce positive circulation of the gas and to insure quick discharge of the excessive hydrogen. The fan also speeds up the heating of the charge.

STEEL 3-12-31

Vitreous Enameling

Enameling of cast iron discussed by J. H. D. Bradshaw, in Foundry Trade Journal (London), Feb. 12, *p.* 123, 2 *pp.*

Castings for enameling should have a clean surface, free from blowholes, roughness, scabs or other surface defects, and should be designed free from sharp angles or corners. Iron intended for castings suitable for enameling should be of uniform composition. The author discusses the coloring of enamels, its preparation, grinding of the frit, application of enamel to the castings, dusting process, wet or swilling process, modification of the wet process and majolica effects on cast iron. One of the principal factors insuring success of the latter effect lies in the careful selection of a white undercoat having a higher fusing point than the colored cover enamel.

STEEL 3-12-31

PRODUCTION:

Refining Steel Ingots

Miris process, an English development, for refining the structure of steel in ingot form, discussed in the Iron & Steel Industry (England), February 1931, *p.* 171, 2½ *pp.*, 1 *illust.*

The steel while in ingot form is subjected to a chemical treatment at predetermined temperatures, varying with the grade of steel. The ingots subsequently are reheated, passed through the blooming mill and rolled into the finished commodity. The refinement of grain structures presists throughout all stages of rolling and working, effects of the process not being destroyed by subsequent heat treatment. Details of the process, other than stated above, are lacking.

STEEL 3-12-31

MISCELLANEOUS:

Protection Against Rust

Means for preventing metal from rusting while in storage, presented by Joseph Geschelin, in Automobile Industries, Feb. 21, *p.* 256, 5 *pp.*, 5 *illusts.*

Scientific study shows that atmospheric corrosion of iron and steel stocked for future requirements, may be eliminated by maintaining the surface temperature somewhat above the prevailing dew-point temperature. Wherever raw stocks of strip, sheets and structural shapes are maintained, it is desirable to store them in suitable inclosure provided with a heating arrangement, preferably a unit heater. The size and location of the unit heater should be determined to assure a definite control of temperature at the surface of the pile of metal and a free circulation of air around it. The heater usually is fed from some central source of steam supply but where this in not available, an electric type unit can be used.

STEEL 3-12-31

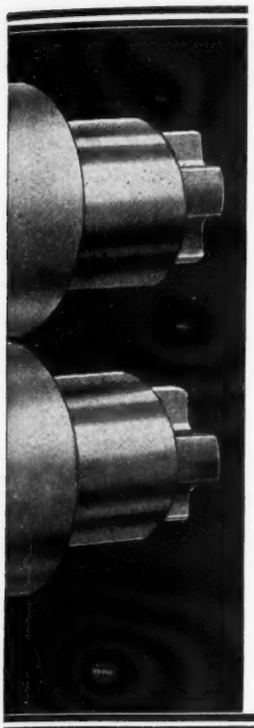
Blueprinting Room

Plans and equipment of a blueprinting department that enables two men to average more than 10,000 *blue prints a month, discussed by E. H. Bruce, in Machinery, March* 1931, *p.* 516, 1½ *pp.*, 4 *illusts.*

The department is arranged around a one-half cylinder, vertical type, blueprinting machine and a horizontal cylindrical dryer. As the department has standardized on one grade of tracing paper, tracing cloth, bond paper for typewritten lists, etc., there is no guesswork as to the time required for printing. A layout of the department showing route followed in making prints, a daily record of prints and a form used in ordering prints are presented.

STEEL 3-12-31

THE ROLLS *with the* GREEN WABBLERS



The great strength, uniform structure and unequalled wear resisting qualities of Unefco rolls have made them the outstanding choice of the rolling mill industry for practically every type of mill.

They have proven their tonnage production is second to none, they are surviving in service where others have failed, and are making possible some of the recent World Record Rolling Schedules. Be sure of the best. Specify Unefco, "The Rolls with the Green Wabblers."

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Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

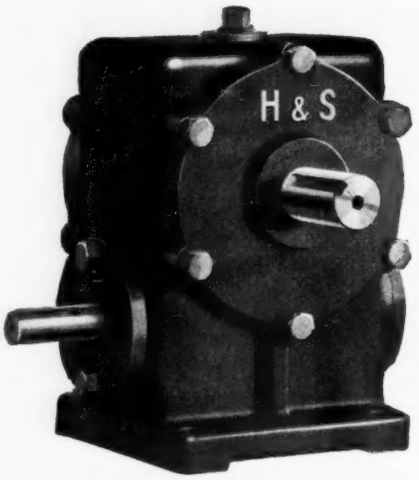
Grinder "Sparking Out" Is Controlled Electrically

Heald Machine Co., Worcester, Mass., has developed a "sparking out" attachment for use on their internal grinding machines equipped with automatic gaging apparatus. To attain fine finish, the grinding action on precision internal work must go on for a certain period after the feed has been discontinued, thus permitting a natural dying out of transverse pressure between wheel and work. This relieving of minute spindle deflection is what is known as "sparking out."

Time Cycle Control

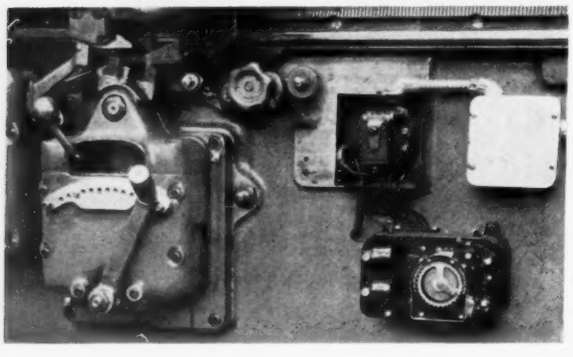
The new attachment, an essential part of which is an electrical time cycle control, is shown in its principal details in the accompanying illustration. When the roughing gage enters the hole, in the case of a machine equipped with the new attachment, it not only causes the wheel to withdraw for dressing, but in addition makes an electrical contact which actuates an electromagnet on the cross slide unit. This magnet disengages the feed pawl and under the influence of the time-cycle control holds it out of engagement throughout the finishing cycle. In other words, the cross feed is disengaged automatically after the roughing cut and the hole is brought to size by the residual pressure between wheel and work.

An electrical connection between the magnet and the toggle switch on the control box keeps the magnet energized, and the feed pawl thereby disengaged, until the table carrying the wheel head withdraws to rest position. Time required for "sparking out" is brief, being governed by the small amount of stock left in the hole after roughing, this, in turn, being determined by the adjustment of the diamond on the automatic wheel truing apparatus.



Speed reduction under medium torque is accomplished by this unit

It will be recalled that the automatic sizing principle of the Heald-type internal grinder is that the wheel always is true so that its working face is a certain distance from the finished size of the part being ground. That is, when the wheel reenters the work after dressing, the amount of pressure between the wheel and work always is the same within narrow limits. This allows a uniform amount of stock to be removed in a given length of time after the feed is stopped. It is pointed out that when maximum finish is required and production time can be more or less disregarded, it is desirable to add a time relay controlled backing-off attachment to lift the wheel clear of the ground surface before its withdrawal.



Smooth finish within exacting limits of accuracy is assured through use of this automatic electrical "sparking out" control for internal grinders

◆

Worm-Type Speed Reducer Built in Small Size

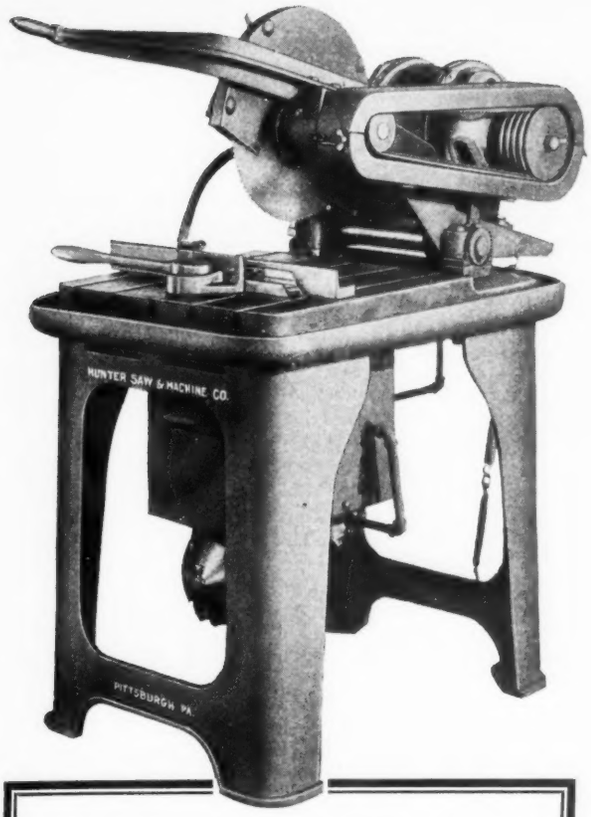
Horsburgh & Scott Co., 5114 Hamilton avenue, Cleveland, has brought out a new line of small worm gear speed reducers to supplement the company's line of similar reducers of large size. The accompanying illustration shows one of the new reducers and indicates the rugged simplicity of its design.

Among the features pointed out by the maker are: Worm forged integral with its shaft, which increases rigidity by permitting larger diameters, and guarantees absolute concentricity with impossibility of worm becoming loose; glass-hard worm threads with top, bottom and sides finished by grinding after hardening; extra wide solid bronze worm gear generated by a hob which is an exact duplicate of the worm; worm shaft mounted on radial thrust ball bearings; and gear shaft mounted on tapered roller bearings.

One-Piece Housing

The housing is a heavy one-piece gray iron casting allowing introduction of the gear through its side. Heavy external ribs resist distortion from unusual loads, and carry bearing loads to the base of the unit. The interior of this housing is entirely free from projections or pockets which might set up oil swirls with consequent heating and loss of power. Unfailing lubrication is provided, contact surfaces between worm and gear always being beneath the oil surface. Worm and gear bearings are lubricated directly from this same reservoir which is of ample capacity to insure cool operation of the unit. Large filler and drain plugs are provided and a gage cock registers oil height. Oil seals on both shafts, together with carefully assembled gaskets, prevent leakage.

Two models of this speed reducer are kept in stock, one having max-



a NEW HUNTER *Cutting-Off Saw* No. 6

Designed and built for the rapid cutting off of light section steel tubes and shapes, brass, copper and aluminum tubes, shapes, and solids up to 3″ diameter, this husky machine features several advantages of interest to those endeavoring to reduce production costs.

In addition to being exceptionally fast it is also much more versatile than other machines of this type. The saw being driven by a Vee cog belt, enables you to use saws of various diameters within a range of 10 to 18 inches without changing motors. The motor acts as a balance for the saw arbor on the swinging frame.

A coolant pump is provided which is driven by an independent ⅛ H.P. motor and is located beneath the saw table on the reservoir. A ledge extending around the table and cast integral with it, carries the coolant back to the reservoir.

Four machined "T" slots run the entire length of the table to accommodate the quick acting vise jaws which can be adjusted for both straight and angular cuts.

These are but a few of the many reasons you should investigate this new, modern cutting-off saw. It will cost nothing to look this over.

We also manufacture: Inserted Tooth Saws, Circular Milling Saws, Pneumatic Hammer Rivet Sets, Chisel Blanks and Hardened Steel Specialties.

HUNTER SAW AND MACHINE CO.

5656 BUTLER STREET, PITTSBURGH, PENNA.

imum gear torque on gearshaft of 1100 inch-pounds while the other has a maximum torque of 2140 inch-pounds. In both models worm shaft speeds range from 300 to 3000 revolutions per minute, and 16 different gear ratios are available, prompt shipments being made from standard stock.

◆

Heavily Coated Electrode Provides Ductile Welds

General Electric Co., Schenectady, N. Y., announces a new heavily coated electrode for use on welds where extra quality is demanded. The rod is 0.13 to 0.18 per cent carbon steel covered with a heavy layer of cotton braid which is impregnated with arc-welding flux. It is available in diameters ranging from ⅛ to ⅜-inch, in 18-inch lengths.

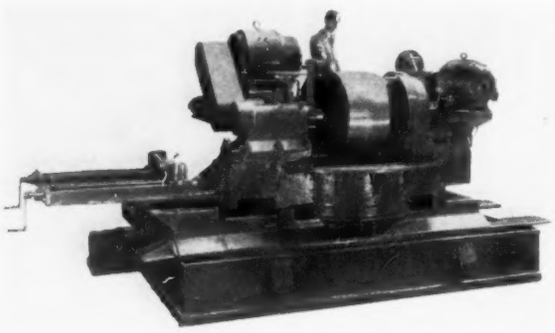
Metal deposited by this electrode has high tensile strength and homogeneous structure, which results in welds of unusual ductility. These characteristics are due to the fact that during the arc transference period the metal is surrounded by a protective atmosphere, the electrode burning away more quickly than its coating. Extreme arc stability and high arc voltage permissible under these conditions allow high speed on certain jobs. The new electrode is recommended particularly for pipe line work.

◆

Structural Roll Grinder Is Cam Controlled

Farrel-Birmingham Co., Ansonia, Conn., has developed a machine to grind vertical rolls used in universal mills to roll heavy structural H-beams. This machine, shown in the accompanying illustration, will grind combination tapered and curved surfaces on rolls of 42-inch diameter and 18-inch face. It will grind the middle portion of the face on a true radius, while the sides are ground to a straight taper, usually of 4 or 8 degrees but maximum of 12 degrees being possible. The machine also can be set to grind straight face rolls.

A substantial carriage is fitted with a swivel table which rests upon heavy-duty ball bearings and has its pivot pin carried in adjustable tapered roller bearings. The carriage itself slides on inverted V-ways. Integral with the swivel table is a lever arm carrying a nut which is adjustable over a distance of approximately 3 feet. When the machine is operating, a carriage traversing nut moves along in a screw connected by linkage with a bell crank.



Tapers and radius required on structural rolls are reproduced rapidly and accurately by means of this heavy duty form grinding machine

Method of Forming

A roller on this bell crank travels in a slot parallel to the axis of the work until it comes to an opening in the wall of the slot. Resistance of the carriage assembly on the ways is greater than the resistance of the swivel table to rotation, hence the carriage assembly stops and the bell crank swings around until its roller contacts with the opposite wall of the guide slot, which prevents further rotation of the table and again causes the carriage to move forward. The degree of revolution of the table is regulated exactly by the adjusting nut carried on the arm of the table.

A dead center type of headstock is used, its face plate being driven by a pair of double helical gears and a worm gear reduction. The tailstock has sidewise adjustment and is equipped with a roll face indicator to permit centering of work with the carriage pivot. A 30-inch diameter by 3-inch face grinding wheel is used, this being mounted on a heavy spindle driven from a motor by multiple V-belts at speeds ranging from 575 to 1150 revolutions per minute. Both hand and motor driven feeds are provided. A centrifugal pump with direct connected vertical motor is located above a settling tank and assures a generous flow of coolant to the point of grinding. The capacity of the settling tank allows for plenty of coolant.

As each unit of the machine is individually motor driven, under variable speed control, properly coordinated speeds for all the units can readily be obtained.

Having knurled grips instead of handles, close quarter gaging is possible

◆

Stub Gages Applicable in Precision Boring

Pratt & Whitney Co., Hartford, Conn., has placed on the market a new design in stub gages for use in connection with precision boring. The accompanying illustration shows a complete set of these gages in the wooden case which is furnished with them.

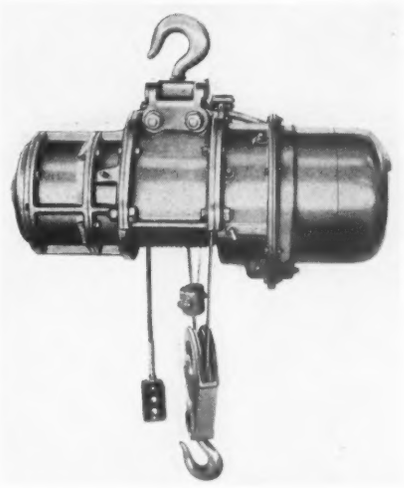
In most precision boring machines, the vertical travel of the tool is obtained by a means of a quill, while the head itself remains clamped in one position. This is desirable practice, because any movement of the head to provide gaging clearance below the tool is liable to introduce errors which are serious when tolerances are close. This new type of gage overcomes difficulties arising when clearance between tool and hole is small, as ordinary quill travel provides ample clearance for its convenient use.

The new gage has the standard cylindrical gaging surface, but a short knurled finger grip takes the place of the usual handle. Larger sizes are made hollow for lightness, and a hole through the fingergrip permits insertion of a pin when desirable. The new gage is made of alloy tool steel heat treated to gage hardness and toughness. The gaging surface is machine lapped to size. These gages are available either singly, or in cased sets of 17 sizes, ranging from ⅛ to 2 inches, as shown in the illustration above.

High-Speed Electric Hoist Operates Economically

Wright Mfg. Co., Bridgeport, Conn., has brought out an electric hoist designed particularly for installations demanding high operating speeds, with economy of operation, and low maintenance cost. One of these hoists is shown in an accompanying illustration.

In order to obtain high operating speeds with efficiency, especially designed motors of liberal size are employed. Dependability and low maintenance costs are insured by simple and rugged design, such details as drop forged alloy steel shafts, heat treated steel gears and pinions and heavy-duty cable being employed. Motors, controls, and other vital parts are fully enclosed by dustproof and weatherproof covers, making the hoists suitable both for indoor and outdoor installation. They are designed for various common types of suspensions and are furnished either with push-button or pendant rope control, there being no differentiation in price between the two types of control.



This hoist features low operating cost on indoor or outdoor service

◆

Hydraulic Machine Roughs Spiral Bevel Gears

Gleason Works, 1000 University avenue, Rochester, N. Y., has brought out a new hydraulically operated automatic machine for roughing out spiral bevel gears prior to finishing. This machine, which appears in the accompanying illustration, is exceptionally fast, it being claimed by the maker to reduce the time required for roughing gears by 60 per cent.

Safety features are provided to minimize cutter breakage and spoiled work, operation being nearly foolproof. To secure maximum rigidity, the cutter-spindle housing is bolted to the base, while the work-spindle housing is bolted to the frame, the two heads being tied together by a heavy overhead arm. Direct coupled motors are mounted inside the frame, and control valves and electrical switches all are grouped in a convenient operating location. Chips fall into a pan in the base where they are drained of coolant and from which they are removed easily while the machine is in operation.

Work is chucked hydraulically by opening a valve, then the head is moved into position and the cutter motor started by pressing a button. No generating motion is employed, the tooth slots being cut by a simple depth feed motion of the cutter into the work. After each slotting operation, the cuttter is withdrawn to permit the work to be indexed for the next cut. The entire saddle assembly is adjustable horizontally and vertically on its upright to set the cutter to the proper spiral angles, with a simple auxiliary adjustment for taking up cutter wear. The spindle runs on preloaded antifriction bearings and accurate cutter mounting is assured by grinding the nose of the cutter spindle to size with the spindle mounted in place. Hydraulic feed movement is all on the journaled spindle sleeve. Depth of feed is varied by an adjustable stop screw, while a hydraulic control valve facilitates changing the feed.

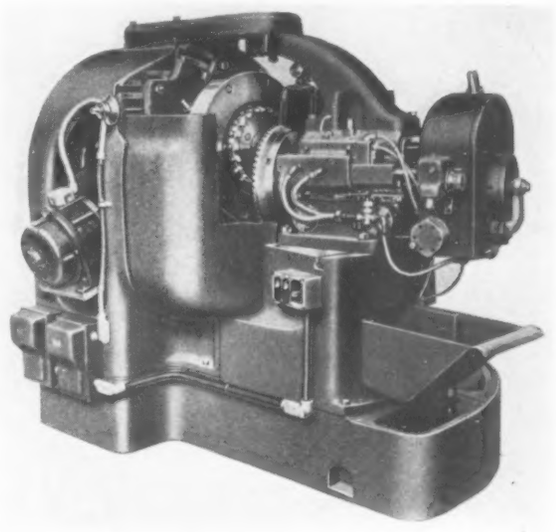
The cutter is driven through change gears by a pinion which in turn drives an internal gear bolted to the faceplate. A heavy flywheel on the spindle faceplate gives unusually smooth action. The work spindle, which has angular and linear adjustments, remains stationary except when the work is indexed, two clamps operating automatically with equal tension to secure the work spindle sleeve. After all teeth are roughed, the work is automatically moved away from the cutter to permit its removal.

The hydraulic chucking mechanism is an integral part of the machine, gears being drawn back against a shoulder on their arbor by means of a draw rod extending to the back of the work spindle. The work is released automatically when the head backs away after roughing out the last tooth. The draw rod is adjustable for length and the entire chucking mechanism, with the exception of the arbor, can be used for any gear of standard design.

Indexing Mechanism

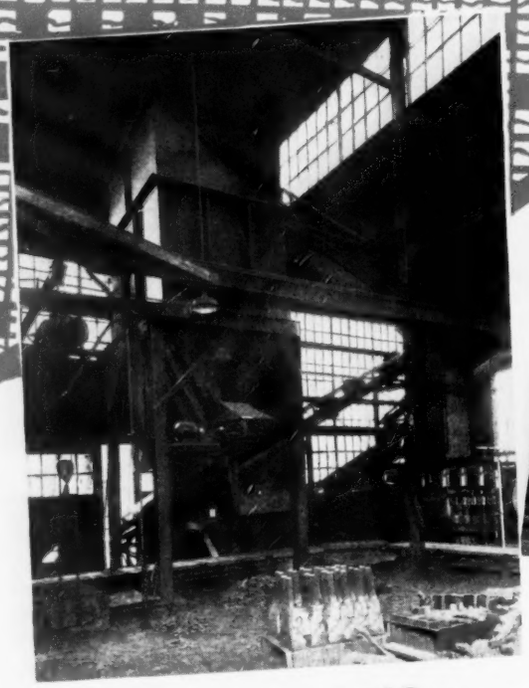
The notched plate index mechanism is actuated hydraulically. To change from one number of teeth to another it is necessary only to change the index plate and readjust the automatic device which stops the machine when the last tooth is cut and which resets itself after each blank is roughed, thereby eliminating any possibility of recutting a tooth.

Hydraulic pressure is supplied by an individual unit built into the machine, this unit being driven by a separate motor which also drives the coolant pump. The machines are built for motor drive only, cutter drive being by 5-horsepower standard constant-speed motor running at 1500 or 1800 revolutions per minute, while an individual 3-horsepower motor running at 1000 or 1200 revolutions per minute drives the hydraulic unit and coolant pump. Standard equipment furnished with the machine includes

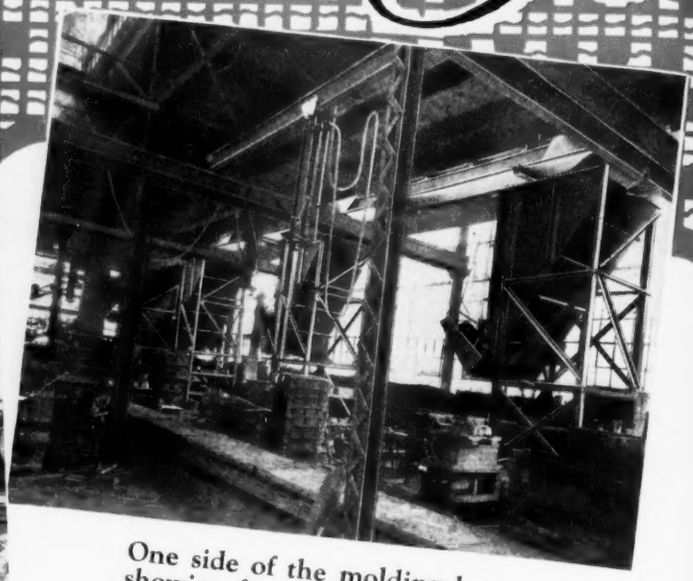


Rigid construction, together with advantages of hydraulic operation, make this roughing-out machine an effective addition to the department employing spiral bevel gear generators

A

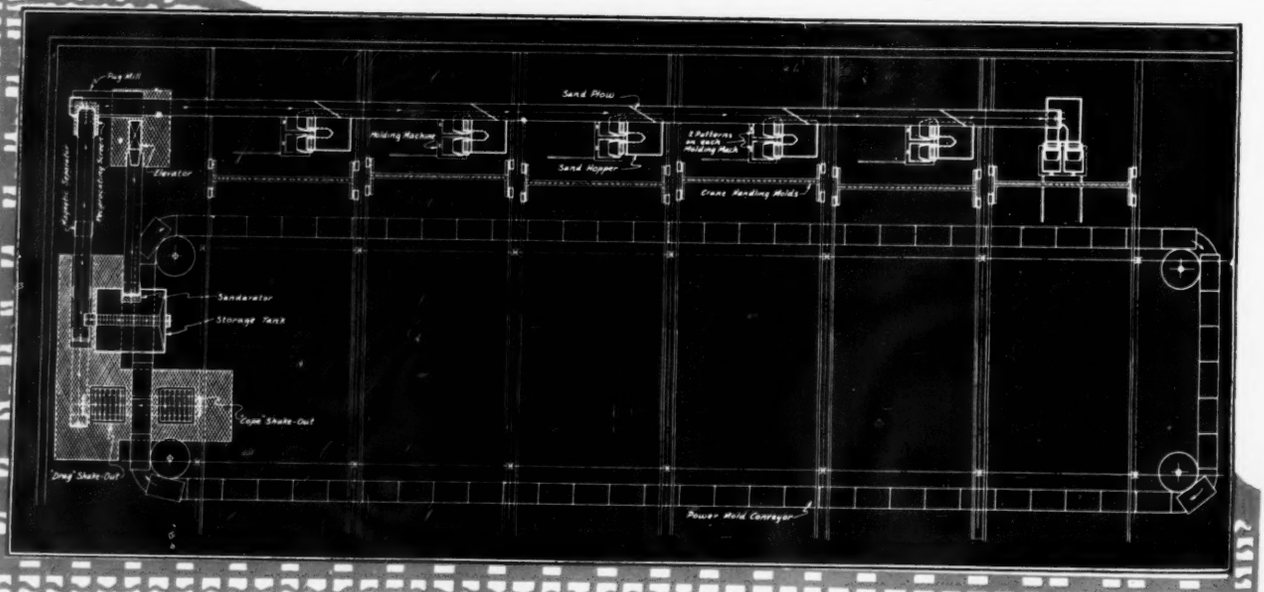


Beardsley & Piper Sand Conveyors, Magnetic Separator and Sand Elevator to the overhead distributing belt. This belt conveyor arrangement effects a worthwhile saving in space.



One side of the molding bay showing four of the six molding stations and the mold handling conveyor common to each station is in the lower foreground.

The layout below shows the original plan of sand system as designed, manufactured and installed by Beardsley & Piper Engineers. The three illustrations above are detailed views of the sand hoppers, elevators, conveyors, magnetic separator and mold handling conveyors as installed.



BEARDSLEY & PIPER MOLDING SYSTEM

A close-up of one of the Beardsley & Piper designed molding stations. Note the double sand chutes from which two flasks are filled at a time independently of each other, providing for the making of two different molds at the same time.

Beardsley and Piper are foundry specialists — manufacturers of foundry equipment — designers and builders of Sand and Mold Handling Systems: *Sandslingers*, Sandmullers and other equipments, exclusively for foundry use.

Each foundry installation that we plan and design is a distinctively separate job based on the definite, concrete needs in the shop for which it is intended. Each unit is developed and engineered into the System to produce more and better castings at lowest possible cost. Every installation is planned by trained engineers — only materials of highest quality are used and grade of workmanship is above standard. On installations where specialized Beardsley and Piper equipments are needed they are used. Where other types of foundry equipment are desirable, there is no hesitancy about our using them.

Beardsley and Piper equipments are not manufactured on a production basis. They are made to fit the conditions under which they must operate. We have no panacea for foundry ills. Rather, our work is to provide the lowest cost, highest efficiency equipment available on each and every installation.

THE BEARDSLEY & PIPER CO.

Sand Conditioning, Conveying and
Moulding Equipment
2541 N. KEELER AVENUE, CHICAGO
Representatives in Principal Foreign Countries

index plate, full set of speed change gears, cutter gage, automatic stop and hydraulic power unit without its driving motor.

Safety Apparatus Protects Operators of Presses

Positive Safety Mfg. Co., 4408 Perkins avenue, Cleveland, announces important improvements to the Possons-type safety device for use with power presses. Among the design refinements, which are shown in the accompanying illustration, are: Visible cord and cable assembly which brings all working parts into plain view; adjustable ram connection which operates below any possible breaking point; and a frame attachment which is adjustable both to upright and inclined position of the press. Working parts throughout the device have been strengthened, and maintenance has been made more simple to insure that it will give unfailing operation throughout long press runs.

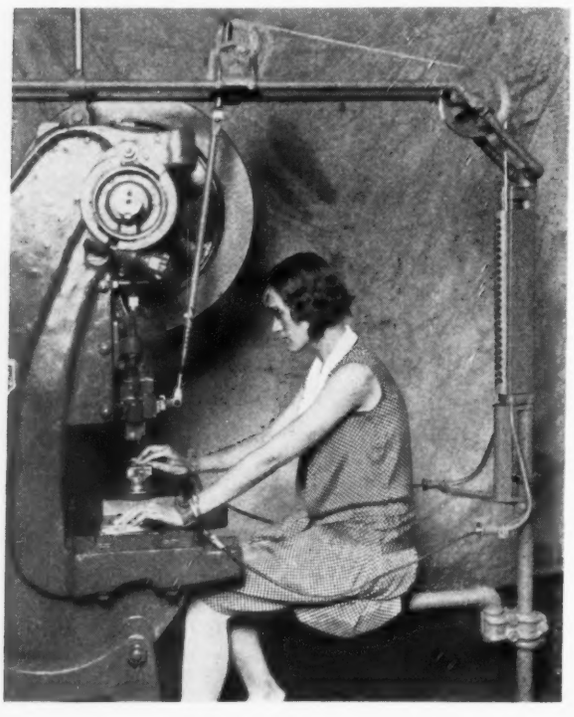
Mode of Application

Special hand straps are attached to the wrists of the operator, passing out under the thumbs. These straps are attached to flexible cables by means of quick-release safety clips. The pull-back cables extend upward through tubes which are supported on brackets attached to the main column of the apparatus, and their other ends are attached to a slide which operates up and down in time with the stroke of the press. The slide is actuated by a steel cable to a rocker arm which in turn is connected to the ram of the press.

The ram, on its downward stroke, pulls back the cables, thereby definitely drawing the operator's hands from the danger zone. The amount of free cable, the distance of pull-back, and the speed of withdrawal all may be regulated exactly to fit the job and the apparatus is locked in adjustment by the foreman. When the device is in use no moving parts enter the field of operation, there is nothing to interfere with the handling of work, complete freedom of operation is allowed in every direction, and either side of the press or the floor can be reached with ease, all this tending to make the apparatus thoroughly popular with press operators.

Pull-Out Multiplier

For use on short-stroke presses or for jobs requiring extra quick withdrawal, a unique pull-out multiplier is provided. This is geared up so that from 3 to 5 inches of pull-out is given on the first ½-inch downward stroke of the ram. A rack on the connecting rod engages a cam and pinion mechanism, the accelerated pull-out resulting from the winding of the cable on the cam. Either floor or ceiling attached guards can be furnished, the special pull-out multiplier being optional equipment with either type. Standard designs are adaptable to practically all kinds of power presses.

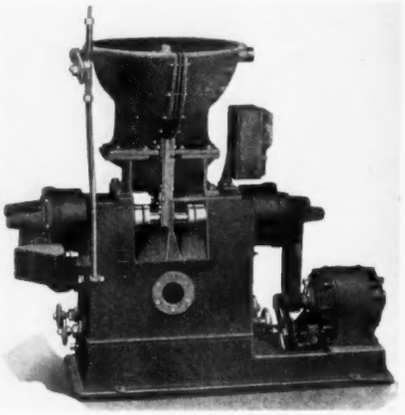


Hazards of punch press operation largely are eliminated by this apparatus which, through an ingenious system of cables, slides and levers, withdraws the hands from the danger zone at the beginning of each downward stroke

Duplex Automatic Machine Countersinks Nuts

Kent Machine Co., Cuyahoga Falls, O., announces a duplex machine for countersinking finished or semifinished nuts from ½ to 1 inch in diameter. The accompanying illustration gives an idea of its construction and of the system of drive.

The machine is fully automatic in its operation, having one hopper which feeds work to both sets of countersinking spindles. These spindles, which are located on opposite sides of the machine, have both rotating and reciprocating motion. Provision is made for adjustment of the work to give any desired depth of countersink, irrespective of its thickness, which insures the same amount of countersinking on every individual nut. The nut is fed from the hopper through a magazine chute to a formed receptacle where it is gripped as the countersinking operation takes place, then it is ejected automatically and a new nut immediately take its place, upon which the countersinking cycle is repeated.



Hopper feed and cam control speed up nut countersinking

Operating Features

Spindles and other working parts are controlled from a single cam shaft located between the countersinking spindles at the center of the machine. Forced lubrication is provided to all bearings. Changes to different sizes of nuts with the capacity of the machine are made easily and quickly. The spindles make 60 reciprocations per minute, which gives production of 7200 units per hour.

This is recommended as a profitable second operation machine for use in plants where primary operations likewise are performed by fast automatic machinery.

Strong Sinter

Clean Sinter

Greenawalt Sintering Pan. Grates automatically clean themselves with each dumping movement.

BY the removal and sintering of all fines from your blast furnace charge, Greenawalt Sintering Plants will greatly increase the capacity of the furnace, overcome dust losses, and reduce operating costs.

High suctions give strong sinter. Thorough screening gives clean sinter.

Rugged construction and few wearing parts assure long service and unusually low maintenance cost.

COMPLETE PLANTS DESIGNED AND CONSTRUCTION SUPERVISED

JOHN E. GREENAWALT, 110 East 42nd St., New York City

85 South German St.
Denver, Colo.

46 Victoria St.
London, S. W. 1

7 Bis Rue Alexandre-Parodi
Paris

GREENAWALT *for* Sintering

Steel Angles from Chicago

(*Concluded from Page 25*)

International Harvester ten days ago started 48 carloads of farm implements and machinery to Wichita, Kans., and other points from its plants at Rock Island, Moline and East Moline, Ill. Other shipments already have gone to Texas. International's warehouses in the Twin Cities district have just shipped 21 carloads of tractors to eastern North Dakota.

Despite the fog that blots the immediate view in the implement industry, general agricultural conditions seem to belie the probability of a continuation in the implement and tractor industry of a slow season throughout all of 1931. The distress that still is strikingly evident in some sections of the West and Southwest, where effects of last summer's drought were most severe, complicates the scheduling of implement and tractor production for the spring assembly lines.

See 1930 Program Reversed

It seems more probable now that the implement industry this year may see conditions just the reverse of 1930. In that year, the first quarter found production continuing as an extension of the brisk tool marketing of 1929 and the three preceding years, with a scaling down in the final three quarters. This year, it is expected, the first quarter will be the slowest, followed by probably nine months of greater momentum. At least that theory has become quite generally accepted.

Research continues to broaden the implement outlook. Gleaner Combine has pioneered successfully the last two or three years in the new corn combine a harvesting machine that has revolutionary possibilities. A saving of 8 cents a bushel in harvesting and shelling corn is claimed for this product, and a fairly widespread adoption in the Central states seems likely.

Having in mind the vast markets developed for the wheat combine, its promoters believe the savings demonstrated for the new corn combine assures some popularity among laborsavers for the farmer. As a supplementary product, implement companies thus have possibilities for broadening their fields.

◆

Diversification of products has kept a number of the implement makers off of thin ice. The larger companies have made the output of harvester and tillage equipment only about 20 per cent of their entire business. These have stressed their tractor lines, and have been turning out trucks and service busses, as well as gas and kerosene engines and a number of other lines.

International Harvester, one of the aristocrats of American industry with respect to its self-contained position, did surprisingly well last year in earnings, in the face of the lowest wheat prices since the days of Oliver Cromwell. International's 1930 net has been exceeded only twice since the war, while operating income of $41,224,198 was under only the $59,614,589 in 1929, and the $49,333,613 in 1928. While the company earned only 7.5 per cent on invested capital, as compared with 11.9 per cent in 1929, 10 per cent in 1928, and over 8 per cent since 1924, net income represented a higher percentage of operating income.

◆

Caterpillar Tractor Co., Peoria, Ill., will show earnings of around $2 a share, according to the recent forecasts, for the first three months of this year. In all of 1930, Caterpillar's earnings fell off only $1.53 from its record production year in 1929, and its cash position is decidedly favorable. Minneapolis-Moline Power Implement Co. and subsidiaries throughout the Northwest in 1930 earned net of 56 cents, against $1.87 in 1929. Deere & Co. is another that made a comfortable balance sheet, while the farm depression was on. For the year ended in October, 1930, its earnings were equal to $6.06 a share after preferred, and the surplus was nearly $4,000,000. Earnings were exceeded only twice in the company's history.

Several substantial steel castings orders have been lost to a few of the steel jobbing foundries in the Chicago district through the decision of a large tractor maker to use rolled steel plate sections instead of light steel castings for tread lugs in its track-laying type tractors. This means a loss of hundreds of tons of castings in a good tractor year, and consequent gains in rolled steel consumption.

Water Rates Help Steel

Repercussions of the mileage scale freight rate order, which went into effect last year, are noted as a part of the rail-water fight on steel shipped from Chicago to Milwaukee. Chicago & North Western and Chicago, Milwaukee, St. Paul & Pacific have published and gained official approval of a Chicago-Milwaukee fabrication-in-transit rate for steel products moving to Michigan automotive centers.

Last year's mileage rates increased the all-rail tariffs on finished steel from Chicago to Milwaukee from 9½ cents to 14½ cents. Consequently, thousands of tons of steel for pipe line production and automotive frame building and other uses began moving to Milwaukee by water. Motor trucks took up much of the load at the close of the last navigation season.

The carriers, becoming alarmed, sought to regain this rail traffic lost to the lake boats and trucks. The two roads then published a fabrication-in-transit rate for Milwaukee to seven points in Michigan, including Detroit, Flint, Pontiac, Lansing and several others, but this applies only to plates, structurals and other fabricated steel for automotive frames. It will affect almost entirely a Milwaukee frame maker that turns out frames for General Motors plants.

Steel plates for pipe line work, and fabricated structural steel for purposes other than automobile frames are not accorded the fabrication-in-transit privileges. The rate is 31 cents to Detroit, plus 2 cents fabrication charges, or a total of 33 cents, equalizing the rate from Chicago to Detroit, embracing the Chicago-Milwaukee water haul, this complete rate also being 33 cents.

The new rate, of course, will tend to divert traffic again from the boats, and the controversy still is on. But the steel companies have favored the new arrangement, and thus the railroads, with a good automotive season, are all set for gains in this attractive rail haul.

Trucks May Gain Tonnage

Trucking of steel originating and reaching destination within the local switching district through Chicago's streets may be the result if the intra-district rail freight rate finally is raised, as has been proposed. The Chicago switching district has become a complete transportation system in itself. Nowhere is there a counterpart, it is contended.

It extends 40 miles, from Evanston, Ill., through to northern Indiana points, has a maximum width of 15 miles, 5000 miles of trackage, 35 railroads serving about 4000 industries with sidings. The agitation for higher switching district rates also is an aftermath of the mileage scale.

The minimum rate for a minimum haul under the mileage system is 6 cents, and as intra-switching-district hauls could be made at lower rates for distances even longer than the minimum ten miles on the mileage scale, it was suggested that carriers bring the rates that grew up in the district from natural development in line with the comptometer rates of the interstate commerce commission.

◆

Some estimates are that more than 40 per cent of the district's car movements are intra-district. In good times, 1500 carloads a day thus are handled. In 1911, the rate was 1.5 cents when the shipment was confined to one or two of the rail lines in the switching ditsrict, and .5-cent additional for each other road over whose tracks the shipments passed. The new scale proposed by commerce commission examiners specifies 3 cents for one-line, 3.5 cents for two-line, and 4 cents for multiple-line hauls. Shippers and the municipal government have become interested and have taken up the fight.

Steel Corporation Advances Prices

Subsidiaries Put Bars, Plates, Shapes Up $1, Most Wire Products $2, for Second Quarter—Steel Sentiment Lower—Pipe and Structurals Active

SUBSIDIARIES of the United States Steel Corp. are taking the lead in adopting price advances for the second quarter. Carnegie Steel Co. has announced 1.65c, base, Pittsburgh, as its second quarter contract price on steel bars, plates and shapes; this equals the current nominal asking price and is $1 per ton over first quarter contracts. American Steel & Wire Co. is putting up all wire products except fencing and bale ties $2 per ton.

These increases follow last week's advance of $1 per ton on hot-rolled and $2 on cold-rolled strip steel. Some producers are extending first quarter levels on sheets, cold-finished bars, bolts, nuts, rivets and semifinished steel other than wire rods when protection is sought, which is infrequent. For several weeks most pig iron producers have been extending their quotations.

Presumably, independent producers will accept the lead of the Steel corporation. There is considerable opinion, however, that the state of demand rather than the state of mind of producers concerning present unremunerative prices will be the final determining factor. In view of the slightly easier tendency in some products the past few days, the advances will at least be a defensive gesture and may, if sustained by bookings, improve billings. With eight automotive buyers requesting prices by March 14 on various steel products, the situation may be clarified shortly.

Following the substantial rise in demand in January and February the iron and steel markets again are in a condition where judgment based upon one week alone may be distorted. Demand ebbs and flows from week to week—being in the ebb this week. There is no mistaking that sentiment has suffered considerable loss, yet the majority opinion of the industry is that the trend will continue upward, even if mildly so. First quarter earnings reports may show a slight gain over the last quarter of 1930.

Some producers of steel report the first ten days of March less productive of new business than the comparable periods of January and February; others note slight improvement. On the face of hitherto reliable operating reports by districts, steelmaking operations this week are fractionally higher at 55-56 per cent. Youngstown at 50 per cent is up 2 points, Chicago at 57-58 is up 2 to 3 points, Pittsburgh at 50 is up 1 point, Cleveland at 65 is up 7 points. Birmingham at 65 per cent and eastern Pennsylvania at 53 are unchanged. Buffalo is off 3 points to 54 per cent.

If these rates are held, the March daily ingot rate should slightly better the February average of 105,305 gross tons daily, rating February output at 52.6 per cent of capacity. Over January, which was a 45.9 per cent steel month, the February rate was a gain of 14.5 per cent. Thus far none of the 7 blast furnace stacks lighted in February has been blown out, giving March the benefit of at least a half month's additional pig iron production. The Steel corporation's decline of 167,157 tons in unfilled orders as of Feb. 28 resulted more from increased production than declining bookings.

A. O. Smith Corp., Milwaukee, has booked 20,000 tons of 26-inch steel pipe for the Southern Fuel Co., Los Angeles, with 30,000 tons for this project yet to be placed. The Montana Power Co. is maturing a gas line for the Northwest requiring 62,000 tons of steel pipe. On 16,000 tons of cast pipe for Chicago, French bidders were low at $38.36 to $39.30, delivered, but delivery requirements probably will clinch the business for domestic producers at $40.65.

Structural steel awards at approximately 40,000 tons compare with 40,546 tons last week and 32,537 tons a year ago. Four thousand tons for elimination of grade crossings by the Toronto, Hamilton & Buffalo railroad and 3260 tons for a Missouri-Kansas-Texas railroad bridge topped awards.

For 1050 hopper cars for the Bessemer & Lake Erie railroad 25,000 tons of steel will be needed. Nickel Plate has formally distributed 27,400 tons of rails. February freight car awards totaled 50, against 100 in January and 17,027 last February.

STEEL's market composite stands at $31.61.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (March 11, 1931)	**$31.61**
Last week (March 4, 1931)	**31.61**
One month ago (February, 1931)	**31.65**
Three months ago (December, 1930)	**31.74**
One year ago (March, 1930)	**34.95**
Ten years ago (March, 1921)	**45.37**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	March 11, 1931	Feb. 1931	Dec. 1930	Mar. 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.51	18.76	20.76
Basic, valley	16.50	16.75	17.00	18.50
Basic, eastern del. eastern Pa.	17.50	17.25	17.50	18.80
No. 2 foundry, del. Pittsburgh	17.76	18.01	18.26	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	19.50
*Southern No. 2, Birmingham	13.00	13.00	14.00	14.50
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	18.26	18.26	18.26	20.76
Malleable, valley	17.00	17.25	17.50	19.00
Malleable, Chicago	17.50	17.50	17.50	19.50
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	25.04
Gray forge, del. Pittsburgh	17.13	17.38	17.63	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	93.29	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $10.50 to $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.50	2.50	2.60
Connellsville foundry, ovens	3.25	3.25	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	30.00	30.50	33.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	30.50	33.00
Billets, open-hearth, Pittsburgh	30.00	30.00	30.50	33.00
Wire rods, Pittsburgh	35.00	35.00	35.50	38.00

	March 11, 1931	Feb. 1931	Dec. 1930	Mar. 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.60	1.85
Steel bars, Chicago	1.70	1.70	1.70	1.90
Steel bars, Philadelphia	1.94	1.94	1.89	2.27
Iron bars, Chicago	1.75	1.75	1.70	1.95
Shapes, Pittsburgh	1.60	1.60	1.60	1.80
Shapes, Philadelphia	1.81	1.81	1.76	2.01
Shapes, Chicago	1.70	1.70	1.70	1.90
Tank plates, Pittsburgh	1.65	1.65	1.60	1.85
Tank plates, Philadelphia	1.80½	1.80½	1.80½	2.10
Tank plates, Chicago	1.70	1.70	1.70	1.90
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.05	2.25
Sheets, black, No. 24, Pitts.	2.35	2.35	2.35	2.65
Sheets, gal., No. 24, Pittsburgh	2.90	2.90	2.90	3.30
Sheets, black, No. 24, Chicago	2.50	2.50	2.50	2.80
Sheets, blue anl., No. 13, Chicago	2.20	2.20	2.25	2.40
Sheets, galvanized, No. 24, Chi.	3.05	3.05	3.15	3.45
Plain wire, Pittsburgh	2.20	2.20	2.25	2.40
Wire nails, Pittsburgh	1.90	1.90	1.90	2.30
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	13.00	12.75	12.75	16.60
Heavy melting steel, eastern Pa.	10.50	10.50	11.00	16.25
Heavy melting steel, Chicago	9.75	9.85	10.00	13.20
No. 1 wrought, eastern Pa.	11.00	12.50	13.50	16.25
No. 1 wrought, Chicago	9.00	9.25	10.00	13.50
Rails for rolling, Chicago	12.00	12.10	13.00	15.00

Sheets

More Makers Booking Second Quarter Orders at Current Prices—Business Still Light

SHEET PRICES, PAGE 77

Youngstown, O.,—Leading makers of sheets in this district are quoting present prices for deliveries that will carry well into second quarter. Keen interest is centered in blanket inquiries put out by eight or nine of the important automobile builders for second quarter. These inquiries cover various grades of sheets, strip, bars and other materials, a total of about 600 items. Prices are to be submitted at dates ranging from March 12 to 14. The responses to these inquiries are expected to clear up uncertainties on prices, and may prove to be the real test for spring quotations. A steady run of autobody sheet specifications are coming to district mills which are operating at the best rates so far this yer.

Prices have settled generally to 2.35c, Pittsburgh, for common black; 3.30c for autobody; 3.60c for furniture quality; 1.90c to 2.05c for blue annealed depending on gage, and 2.90c for galvanized.

New York—Indications are that most sheet sellers will reaffirm present prices for second quarter, with galvanized at 2.90c Pittsburgh, for jobbers and 3.00c for the general trade; black at 2.35c; and blue annealed at 1.90c and 2.05c. Demand is showing little gain.

Philadelphia—Several sheet sellers indicate their intention to maintain present prices for second quarter. New orders show moderate improvement.

Pittsburgh — Sheet business still lacks a definite upward tendency and recent specifications are little changed from those of the past month. Orders from the automotive industry reveal only a slight increase since a month ago and hesitancy still is noted in buying of other leading consumers. Consumer interest in second quarter is light. Contracts where requested will be issued at prices unchanged from current quotations, although books for that period have not been opened.

The market, therefore, will be continued at 2.35c for black sheets, 2.90c for galvanized, 2.05c for No. 13 gage blue annealed, 1.90c for Nos. 9 and 10 gage blue annealed, and 3.30c for autobody. Mill operations are unchanged at around 45 per cent of capacity.

Cleveland—Sales of sheets in the past week dropped below these of the opening weeks of January and February and the closing week of February. One bright spot, however, is Fisher Body Co.'s releases for late March delivery. Prices are fairly firm at 3.30c, Pittsburgh, for autobody; 3.60c for metal furniture and 3.00c for galvanized. Makers of barrels still are slack and No. 18 gage blue annealed stock has moved slowly to them. Metal furniture interests are slower than in December. Only one mill has named a price for second quarter, a continuation of 2.35c, Pittsburgh, for black.

Cincinnati—New bookings by district sheet mills lead to the belief March business will surpass that for February.

Chicago—Second quarter books for sheets are being opened by an independent producer. It is understood all mills in the district are ready to take second quarter business at extensions of the first quarter quotations. The mill price for No. 24 galvanized will continue 3.00c. Operations are over 60 per cent and an independent producer is starting five of its ten hot mills at Milwaukee, which have been down for about four months. Manufacturing demand is well diversified, except among locker and shelving manufacturers. Farm requirements are improving. Iowa has awarded 1,000,000 pounds of No. 24 gage black sheets, 11⅛ x 78½ inches, to the American Sheet & Tin Plate Co. at 2.945c, with freight from Gary, Ind., to Anamosa, Iowa, 24.5c per 100 pounds. The sheets are for automobile license plates.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
Gary, Indiana Harbor	2.45c
Chicago, delivered	2.50c
Birmingham, base	2.50c
St. Louis, del.	2.70½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.90c
Philadelphia, delivered	3.19c
Chicago, delivered	3.05c
Gary, Indiana Harbor	3.00c
Birmingham, base	3.05c
St. Louis, del.	3.25½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.15c
Chicago, delivered	2.20c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.34c
Birmingham	2.20c

BLUE ANNEALED SHEETS NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.00c
Chicago, delivered	2.05c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.25½c
Birmingham	2.05c

AUTOMOBILE NO. 20

Pittsburgh, base	3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.60c

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00

Gary, Ind., base 10 cents higher.

(Per pound)

Long ternes, 24, unassorted	3.25c to 3.35c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
**7/16-inch and smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, delivered	1.88c to 1.93c
Boston, delivered	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.05c to 2.15c
St Louis, del	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.905c
Boston, del.	1.985c to 2.035c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleveland, base	165c to 1.70c
Philadelphia, del.	1.94c
New York, del.	1.98c
Boston, del.	2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.65c

IRON

Chicago, base	1.75c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi. billet	2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10	
2300	1.50	Cr.	0.45
2500	2.25	51.00 Cr.	
3100	0.55	spring	0.20
3200	1.35	6100 bars	1.20
3300	3.80	6100 Spring	0.95
3400	3.20	Cr., Ni., Van.	1.50
4100 .15 to .25		Carbon Van.	0.95
Mo.	0.50	9250 (flats)	0.25
4600 .20 to .30 Mo.		9250 (rds.,sq.)	0.50

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.75c to 1.80c
Do. 6 1/16 to 24 in.	1.65c to 1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.40c to 2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.80c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread	73 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list	73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished	73 off

HEXAGON CAP SCREWS

Milled	80-10-10-5 off
Upset 1 in. diam. and smaller	85-10 off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. and smaller	80-10-5 off
Upset, larger than 1 in.	80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh do, less carloads, 5 kegs or over, 2.65c; and less than 5 kegs, 2.80c.	2.40c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Price May Hold for Second Quarter, Leading Seller Naming 1.65c—Demand Variable

BAR PRICES, PAGE 77

Chicago—Bars shared in general finished steel gains during the week. Mills are not emphasizing the increase in specifications and spot sales of bars, shapes and plates, which made the third best total this year, because of week-to-week variations. The long-range trend is viewed with more significance than weekly gains. Reports are noted of some buyer pressure against prices, but the range of 1.70c to 1.75c, Chicago, is maintained. Second quarter inquiry and sales are light, but it is indicated some protections have been extended on the present price basis. Mills are ready for second quarter orders. Road building and excavating equipment orders have improved. Small scattered gains are noted in implement and tractor steel. Rail steel bar mills are at 75 per cent. Active rail steel fence post demand has appeared. Rail steel commercial bar shapes to the manufacturing trade are 1.60c to 1.65c, Chicago Heights.

New York—Early general announcement of second quarter prices on steel bars is expected as the Carnegie Steel Co. has named 1.65c Pittsburgh, for that period.

Specifications in current contracts have picked up, this possibility being a factor. The current market is 1.65c, Pittsburgh, on new business and 1.60c on contracts. Common iron bars are holding 1.60c to 1.70c, Pittsburgh, with the minimum the more representative.

Philadelphia—Steel bars are unchanged at 1.65c, Pittsburgh, for forward business, but lack the test of tonnage demaod.

Eastern sellers are expected to take similar action to the Steel corporation's announcement of 1.65c, Pittsburgh, for second quarter on bars.

Iron bars are unchanged at 1.60c, Pittsburgh.

Pittsburgh — Specifications for steel bars continue to fluctuate, being slightly more active than during the latter part of February but still light. Second quarter inquiry is more active.

Some doubt is entertained that a further advance will be attempted and it is believed that 1.65c, Pittsburgh, will be general for the second quarter, since the Carnegie Steel Co. has announced that quotation.

Cleveland—Merchant steel bar sales were somewhat improved over the past week by sellers in this territory, some increase in schedules of automobile parts makers accounting for gains in part. Second quarter price by local mills is still deferred though a leading seller has named 1.65c, base, Pittsburgh, on contract tonnage for that time, or $1 a ton advance. Alloy bar price remains at 2.65c, base, f.o.b. mill. Local mills, while continuing to name 1.70c as Cleveland base for both local and outside delivery on merchant bars, will meet 1.65c, Cleveland, and price remains unchanged at a spread of 1.65c to 1.70c.

Republic Iron & Metal Co., 799 Franklin street, Beaumont, Tex., has increased capital to $10,000.

Cold-Finished Bar Sellers Reaffirm Price

Cold Finished Prices, Page 77

Cleveland—Sellers of cold-finished bars have announced a continuation of the 2.10c, base, Cleveland, price for second quarter purchases. The market the past week was dull without marked increases from the automotive industry, gear, blank and allied parts makers. An occasional carload is placed. The current market continues nominally 2.10c, with reports of shading to 2.00c admitted on desirable commitment.

Pittsburgh—Shipments of cold-finished steel bars so far this month are slightly heavier than in February. Improvement in specifications is only slight. Interest in second-quarter contracts is light. The market is quoted 2.10c, Pittsburgh, on new business.

Plates

Market in More Favorable Position—Leading Interest Announces 1.65c, Second Quarter

PLATE PRICES, PAGE 77

Chicago—Plate sales and specifications have gained in the last few days. Plate mills are nearer to having backlogs than any of the other finishing mills. Operations have reached 60 per cent. Prospects are good for continued operations through this month and a part of April, as a result of recent storage tank and line pipe orders. Additional orders for the Texas-Chicago natural gas line are resulting in heavier shipments to the Milwaukee line pipe fabricator. About 300 tons of plates have been let for dam facing at Colorado Springs, Colo. About 1500 tons of storage tank work for East Texas have been let. Plate quotations are 1.70c, base, Chicago.

Philadelphia—Although 1.70c to 1.75c, base, Coatesville, Pa., prevails on plates eastern sellers are encouraged by the Carnegie Steel Co.'s 1.65c, Pittsburgh, price on contracts, as this is equivalent to 1.75c, Coatesville. Other sellers may endeavor to establish 1.75c, Coatesville, as minimum. Some have received requests recently for protection at 1.70c.

New York—Plates continue 1.70c to 1.75c, Coatesville, Pa., with no announcement for second quarter, except that sellers take a firmer attitude since the Carnegie Steel Co. has announced 1.65c, base, Pittsburgh, for contracts, which is equivalent to 1.75c, Coatesville.

Trade opinion appears divided on the question of an advance. Specifications are slightly more brisk. Some ship and locomotive work continues pending but pipe and tank projects are light.

Pittsburgh — Plate specifications continue light but the outlook is moderately improved. The 1050 hopper cars placed by the Bessemer & Lake Erie railroad will require a fair amount and prospects for heavier activity in line pipe construction are favorable. United States engineers of the Memphis district will close bids April 15 on two dredges requiring 3600 tons of plates and shapes. Lock construction on the Monongahela, Kanawha, Illinois and Mississippi rivers for federal engineers will take 5300 tons of various steel products. Bids on this material will be opened within the next few weeks. Plates usually are quoted 1.65c, Pittsburgh and the Carnegie Steel Co. has officially announced this price for second quarter.

Cleveland — Shipments of steel plates are made from mill to this dis-

trict in occasional carlots. Sales fail to display any tendency toward improvement. The 1.65c, Pittsburgh, base is held on forward commitments.

Contracts Placed

1100 tons, tank work for Standard Oil Co. of New Jersey, Hackensack, N. J.; to unnamed seller.

350 tons, 24 and 36 inch lockbar pipe, First avenue, south, project, Seattle, Wash., to Western Pipe & Steel Co., San Francisco, through L. Coluccio, Seattle, general contractor.

200 tons, two dredgers for a Nevada and a California irrigation district to Ruth Dredger & Equipment Co., Los Angeles.

100 tons, two steel tanks for United States navy, San Diego, Calif., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

10,000 tons, gate hoists, sheet piling, structural shapes, reinforcing bars and other metal work, Hoover dam power house and works, canyon project, Colorado river. Bids opened March 4 by bureau of reclamation, Denver. Six Companies Inc., San Francisco, comprising Utah Construction Co., Henry J. Kaiser and W. A. Bethel & Co., all of San Francisco; Morris Knudsen & Co., Boise, Idaho; J. F. Shea Co. and Pacific Bridge Co., both of Portland, Oreg.; these affiliated companies low at $48,890,995.50; Arundel Corp., Baltimore, second low at $53,893,878.70.

3600 tons, plates and shapes, two dredges for United States engineers, Memphis district; bids April 15.

1500 tons, two car floats, for Inland Waterways Corp., at Cairo, Ill.; bids March 16.

900 tons, two steel hull dredges; bids April 15, United States engineer's office, Memphis, Tenn.

Tin Plate Producers in Better Position

Tin Plate Prices, Page 77

Pittsburgh — Tin plate specifications are well maintained at the recent rate and operations are steady at around 75 per cent. Business shows little further improvement but producers are in a better position than a month ago to maintain current operations which for several companies are at a full rate. Tin plate continues $5, Pittsburgh, per base box. Figures compiled by the National Canners association on the 1930 packs of corn, tomatoes and peas, the three leading vegetables, show that despite drought conditions the total pack of more than 54,700,000 cases exceeded the 1929 pack by over 4,500,000 cases. The pea pack was the largest in history while the pack of tomatoes was exceeded only in 1925.

Railroads

Bessemer & Lake Erie Car Award Is Largest of Year—Rail Inquiry, Fastenings Slow

TRACK MATERIAL PRICES, PAGE 77

New York—February freight car awards totaled 50 units. Approximately 300 freight cars are actively pending. Bessemer & Lake Erie award of 1050 cars is the largest of the year. Four thousand tons of trucks and axles, 21,000 tons of bars, shapes and plates are involved in the Bessemer award. Lackwanna has released specifications for 4500 tons of rails to Bethlehem Steel Co., having specified 3000 tons in January.

Philadelphia — Pennsylvania railroad is inquiring for 90 electric locomotives on a contemplated list of 230, remainder of which will come up later. Apart from castings, the steel tonnage involved is relatively light. Aluminum cabs are being considered.

Reading railroad has completed work of replacing 100-pound rails with 130-pound on a seven-mile run near Ashland, Pa., thus making the entire Shamokin division now equipped with heavier rails. New York Central has 120 locomotives awaiting repairs at Avis, Pa., shops, the largest number housed there at one time in the shops' history.

Pittsburgh—Pittsburgh district car builders benefited considerably from the award of the Bessemer & Lake Erie railroad for 1050, 90-ton hopper cars. American Car & Foundry Co. will build 350, Pressed Steel Car Co. 300, Standard Steel Car Co. 300, and Greenville Steel Car Co. 100. Orders of the Pressed Steel and Standard Steel companies will be filled at local plants. The track material market is quiet with specifications continuing seasonally light and new business lacking.

Cleveland—Nickel Plate has divided its 27,400-ton rail order four ways equally among Inland Steel Co., Bethlehem Steel Co., Carnegie Steel Co., and Illinois Steel Co. Part of the order was released to the extent of a few thousand rails last week for immediate needs.

Chicago—No fresh rail inquiry has appeared. Expectations are that Chicago, Milwaukee, St. Paul & Pacific may be out soon for 23,000 tons. Track fastening sales totaled 3000 to 4000 tons. Releases for rails are improving and one mill is operating to capacity. Owing to the huge capacity, the district's rail mill operations remain at about 55 per cent. The roads have absorbed much of the 1930 carry-over. Northern Pacific is to close on additional steel for 500 underframes for stock cars to be built in the company's shops.

Car Orders Placed

Bessemer & Lake Erie railroad, 1050 hopper cars; 350 to American Car & Foundry Co., New York; 300 to Pressed Steel Car Co., Pittsburgh; 300 to Standard Steel Car Co., Pittsburgh; 100 to Greenville Steel Car Co., Greenville, Pa.

Union Pacific, one plow car to Rodger Ballast Car Co., Chicago, to be built by American Car & Foundry Co., Chicago.

Car Orders Pending

Sinclair Refining Co., six 50 or 70-ton hoppers or gondolas.

Fruit Growers Express has temporarily withdrawn its inquiry for 32 underframes.

Semifinished Prices Likely To Be Reaffirmed

Semifinished Prices, Page 88

Pittsburgh — Activity in semifinished steel continues restricted in both shipments and new business. Producers have taken no stand on second quarter prices and interest in contracts is light, requirements usually being taken care of by small lot orders for early needs. The market remains $30, Pittsburgh, for rerolling billets, slabs and sheet bars, $36 for forging billets, and $35 for wire rods.

Philadelphia—Business in semifinished steel is light. Rerolling billets are $30, Pittsburgh, and forging quality $35, with small lots of the latter going at $36. Wire rods are steady at $35.

Youngstown, O. — While books have not been formally opened for second quarter it is expected by most producers that today's price may prevail for that delivery: $30, Youngstown and Pittsburgh. The present irregularity of district sheet mill operation may continue to keep down second quarter purchases of semifinished steel to actual needs.

Cleveland—The leading merchant producer of sheet bars, billets and slabs announces no price change is in prospect for the second quarter, sheet bars, billets and slabs continuing $30, base, Cleveland and Youngstown, O. The company has increased the number of its active open hearths from seven to eight.

Structural Shapes

Small Orders Engage Western Mills—Little Contracting for Second Quarter—Private Construction Lowest for Years—Awards Are 41,258 Tons

STRUCTURAL SHAPE PRICES, PAGE 77

New York—Efforts will be made to establish an increase on contracts of $1 a ton on structural material for second quarter, according to one eastern mill. Little contracting has been done for next quarter. Fabricators in most instances have worked off a large part of material purchased at old prices, but erected steel quotations have failed to reflect higher mill prices. Volume is largely confined to public work which is heavy. Private construction has declined to the lowest point in several years. The outlook for the New York city subway program is not bright.

Boston—The only pending project is 105 tons for a bridge for the New York, New Haven & Hartford railroad at Washington, R. I., bids on which were opened March 9.

Philadelphia — Dull purchasing combined with continued delay in development of new work is weakening sentiment in the structural steel market. Spot shape tonnage is now moving at 1.76c to 1.81c, Philadelphia. Subway work dominates, with 2000 tons for Broad street section up March 16 and 6000 tons for a Market street section due out later.

Announcement of the Steel corporation of 1.65c, Pittsburgh, for second quarter on shapes has firmed shapes to 1.75c, eastern mill, notwithstanding listlessness in current demand.

Buffalo—State public service commission announced approval March 9 of plans for elimination of the New York Central railroad grade crossings in Clarence, a Buffalo suburb. Construction cost is estimated at more than $800,000. Large structural and reinforcing bar tonnage is involved.

Pittsburgh—Structural steel activity remains limited. Inquiry is slightly more active than at the opening of the year but small jobs predominate. Awards include no large lots. Lock construction on inland waterways will require several thousand tons of structural shapes in addition to forgings, castings and reinforcing bars. Specifications for plain material lack improvement and are light.

Cleveland — Hecker-Moon Co., Cleveland, has awarded 100 tons of shapes for a New York Central bridge at Wende, N. Y., to Bethlehem Steel Co. Ohio Public Service Co. building at Akron, O., involving 225 tons, went to an unstated fabricator. John Carroll university project will take 705 tons of shapes. City of Cleveland closed March 11 on general contract for West Third street bridges. A college building at Granville, O., for Denison university takes 175 tons.

Chicago—Structural mills are operating nearly 50 per cent as the result of the recent growing volume of small orders. Fresh inquiry totals about 6500 tons, largely for bridges, schools, and government work. Included is steel for Mississippi river lock gates at Rock Island, Ill. While second-quarter books are being opened, it is understood some protection for plain material had been extended into second quarter on the basis of 1.70c to 1.75c, Chicago.

Contracts Placed

21,500 tons, highway viaduct, Newark avenue to easterly shore line, Hackensack river, Jersey City, N. J., route 25, connecting link, section 2, to American Bridge Co., Pittsburgh, on March 10 with bid of $2,522,070.50.

4000 tons, grade crossing elimination for Toronto, Hamilton & Buffalo railroad, Hamilton, Ont., to Hamilton Bridge company, Hamilton, Ont.

3260 tons, Missouri river bridge, Boonville, Mo., for Missouri, Kansas & Texas railroad, to American Bridge Co., Pittsburgh.

1000 tons, bridge over Platte river, Asheville, Nebr., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

700 tons, addition to Royal Connaught hotel, Hamilton, Ont., to Hamilton Bridge Co., Hamilton, Ont.

656 tons, St. Mary's academy, Monroe, Mich., to Whitehead & Kales, Detroit.

550 tons, bridgework for Burlington railroad, to Vierling Steel Works, Chicago.

500 tons, transmission towers, Panama canal, to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, pier repairs, Philadelphia, to Shoemaker Bridge Co., Pottstown, Pa.

450 tons, shapes and sheet piling, dock for Philadelphia Gas Works, Philadelphia, let through Kolyn Iron Construction Co., Trenton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

450 tons, warehouse for Seattle plant of Pacific Coast Steel Corp., to Pacific Coast Steel Corp., Seattle.

450 tons, public school 120, Queensboro hill, Queens, N. Y., to Hedden Iron Construction Co., New York, through Crest Engineering Corp., general contractor.

450 tons, apartments, Commonwealth and Randall avenues, Bronx, N. Y., to B. Schacht & Sons Iron Works, Bronx N. Y.

400 tons, Illinois state bridge work, to Vincennes Bridge Co., Vincennes, Ind.

400 tons, Canadian Industries building, to Hamilton Bridge Co., Hamilton, Ont.

375 tons, Seventh street bridge, Keokuk, Iowa, to McClintic-Marshall Corp., Bethlehem, Pa.

375 tons, bridges and highways, federal aid project, Mississippi, to National Bridge Co., Birmingham, Ala.; C. G. Kershaw Contracting Co., Birmingham, general contractor.

350 tons, garage, Forest Hills, N. Y., to J. Klein Iron Works, Long Island City, N. Y.; Cord Meyer interests building.

325 tons, girls trade school, Milwaukee, to Wisconsin Bridge & Iron Co., Milwaukee.

325 tons, Rosenwald museum, Jackson park, Chicago, to Hansell-Elcock Co., Chicago; in addition to previous awards.

300 tons, factory building, J. W. Williams & Son, 144th street, New York, to Kues Bros. Iron Works, Bronx, N. Y.; Paul Sterling, general contractor.

300 tons, highway bridge, Beloit, Wis., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, breaker house, Winfield, Ala., to Stupp Bros. Bridge & Iron Co., St. Louis.

275 tons, Salem county bridge, Sharpstown, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

257 tons, addition, Hotel Dempsey, Macon, Ga., to Carolina Steel & Iron Co., Greensboro, N. C.

250 tons, 5-story addition, orthopedic hospital, Lexington avenue, New York, to Hedden Iron Construction Co., New York, through Marc Eidlitz & Son.

250 tons, county bridge, Salem, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

225 tons, building addition, Akron, O., for Ohio Public Service Co., to unstated fabricator.

213 tons, Delaware & Hudson railroad building, Coopersville, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

168 tons, pier, foot of Webster street, Oakland, Calif., to California Steel Co., Oakland, Calif.

150 tons, shapes and bars, extension and remodeling post office, Salisbury, N. C., to Southern Engineering Co., Charlotte, N. C., and Southern General Fireproofing Co., Atlanta, Ga.; Grahn Construction Co., Atlanta, Ga., general contractor.

150 tons, municipal and magistrates'

Awards Compared

	Tons
Awards this week	**41,258**
Awards last week	**40,546**
Awards two weeks ago	**57,705**
Awards this week in 1930	**32,537**
Av. weekly awards, 1930	**35,242**
Av. weekly awards, 1931	**29,411**
Av. weekly awards, Feb	**26,659**
Total awards to date, 1930	**372,841**
Total awards to date, 1931	**323,528**

court building, Beach Channel drive, Queens, N. Y., to Easton Structural Steel Co., New York. C. A. Williams Co., general contractor.

125 tons, state bridge, New York, to American Bridge Co., Pittsburgh.

125 tons, transmission towers, Bagnell line, Missouri.

119 tons, United States engineers building, Sayler Park, Cincinnati, to Meehan Iron Works, Portsmouth, O.

115 tons, bridge, Ft. Plains, New York, to Lehigh Structural Steel Co., Allentown, Pa.

110 tons, apartment, 63rd street, Brooklyn, N. Y., to Simon Holland & Son Inc., Brooklyn, N. Y.

110 tons, bridge on Ashford-Kingman highway, Phoenix, Ariz., to unstated company.

100 tons, state bridge, Marshalltown, Del., to Shoemaker Bridge Co., Pottstown, Pa.

100 tons, tie rods, Western hills viaduct, Cincinnati, to McClintic - Marshall Corp., Bethlehem, Pa.

100 tons, bridges and highways, federal aid project; Georgia, to Ingalls Iron Works, Birmingham, Ala.; C. G. Kershaw Contracting Co., Birmingham, Ala., general contractor.

100 tons, bridge over Southern Pacific tracks near Woolsey, Nevada, to unstated company.

100 tons, Jim Creek bridge, Cowlitz county, Wash., to Wallace Bridge & Structural Steel Co., Seattle.

100 tons, addition, House of Calvary, McCombs road, Bronx, N. Y., to Schnatz Iron Works, New York; Edward S. Murphy, general contractor.

100 tons, New York Central bridge, Wende, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Hecker-Moon Co., Cleveland. Approximately 5 tons of reinforcing bars involved.

Contracts Pending

5500 tons, Broad street section subway, Philadelphia.

2500 tons, transmission towers for Southern California Edison Co., Los Angeles; bids opened.

2500 tons, grandstand, Glenview race track, Glenview, Ill.

2000 tons, including bars, forgings, castings, etc., for lock No. 15, Mississippi river; bids open March 23.

1600 tons, Mississippi river lock gates, Rock Island, Ill.

1500 tons, county office building, Westchester county, White Plains, N. Y.

1100 tons, five bridges for Western Pacific Co., San Francisco; bids received.

1055 tons, bridge over Black river, Louisiana highway commission; bids March 17.

1000 tons, including bars, forgings, castings, etc., for London lock on Kanawha river, W. Va., bids open March 16.

900 tons, hangar, Pearl Harbor, T. H. General contract to A. Will, Ltd.

840 tons, Somers Point-Ocean City, N. J., bridge.

812 tons, two locks, dam No. 15, Mississippi river; bids March 23, U. S. engineer's office, Rock Island, Ill. Other requirements include 637 tons steel castings, 143,700 pounds forgings, 25,300 bolts, 48,700 pounds iron castings, 6500 pounds nickel steel, 3850 pounds of bronze, two 30-inch and one 36-inch sluice gates and valves.

800 tons, highway bridges, New York state.

705 tons, John Carroll university project. Some buildings will be refigured though steel tonnage will be unchanged. General contract pending. Phillip Small Inc., Cleveland, architect.

700 tons, St. Anne church, San Francisco; bids received.

553 tons, bridge over Ouachita river, Louisiana highway commission; bids March 17.

500 tons, girls' trade school, Milwaukee.

500 tons, highway bridge at Kauna, Wis.

450 tons, bridge, La Porte, Ind.; bids March 20.

400 tons, apartment, Sutter & Franklin streets, San Francisco; bids being taken.

378 tons, Marmet lock, Kanawha river; General Contracting Corp., Pittsburgh, general contractor.

322 tons, bridge, Louisiana highway commission; bids March 17.

300 tons, repairs to Walnut street municipal bridge, Philadelphia.

300 tons, West Third street bridges, for Cleveland. Dawson & Finnan, Cleveland, low on general contract at $252,000; Industrial Construction Co., second, at $253,000; W. J. Schirmer Co., third at $258,000.

300 tons, library, Evansville, Ind.; plans out week of March 9.

280 tons, locks, Illinois river; bids open March 14.

250 tons, bridge, Salem, N. J.; bids in.

200 tons, stores building for board of education, Toronto, Ont.

175 tons, building, Dennison university, Granville, O.; bids called March 9.

154 tons, subway under Southern Pacific Co. tracks, Santa Ana, Calif.; bids received.

150 tons, two steel hull dredges, bids April 15, U. S. engineer's office, Memphis, Tenn.

150 tons, Lang street bridge, Cobalt, Ont., for Provincial government.

116 tons, paving work, Mesa county, Colo.; bids March 11.

105 tons, Washington, R. I., New York, New Haven & Hartford railroad bridge; bids opened March 9.

100 tons, highway bridges, Virginia.

100 tons, bridge over Atlantic City railroad, borough of Folsom, N. J.; bids March 30.

Unstated tonnage, hospital, Springfield, O.

Unstated tonnage, steel beam bridge and approaches, Hancock county, Ohio; general contract to Dodge-Hussey Inc., Columbus, O., at $70,549.

Unstated tonnage, 12-story freight house and warehouse, to cost $15,000,000, 1266-foot frontage on Washington street, New York, for New York Central railroad; building plans filed March 9.

Unstated tonnage, reported 45-story building, Wall street, New York, for an unstated Chicago public utility corporation.

Unstated tonnage, work in districts of Newark, N. J., and Philadelphia, for Pennsylvania railroad in connection with expanded electrification program; bids to be taken March 23.

Concrete Bars

Bar Movement Better in West, Where 10,000 Tons Is Pending — Prices Continue Easy in East—Awards This Week Led by 3000-Ton Retaining Wall in South

REINFORCING BAR PRICES, PAGE 77

New York—Concrete reinforcing bar prices are easy with competition keen for attractive public work. Distributors in some instances have been able to secure concessions from their mills. On a few small private projects, prices are steadier but this source furnishes little volume. General contracts have been awarded for work in New Jersey calling for more than 1000 tons. Bids went in this week on 1000 tons for a cross-over in Queens. Bethlehem Steel Co., reported to have booked 980 tons for two Queens subway sections last week, took the business through a distributor.

Boston—Opening of bids for the East Boston tunnel resulted in Mason & Hangar, New York being low at $5,696,000 on the general contract.

Philadelphia—The reinforcing bar market is quiet at 1.65c, Pittsburgh, 2.30c, delivered locally by truck. Wark & Co., Philadelphia, are low on the general contract for the Women's hospital requiring 170 tons of bars. Agoslini Bros., New York, are low on the Camden, N. J., post office job.

Buffalo—An inquiry for 200 tons of new billet steel for a local telephone exchange, for which bids have been received, is reported this week. Early coverage of an inquiry for more than 500 tons for an Erie, Pa., grain elevator, is indicated.

Pittsburgh—Reinforcing bar business is made up largely of small orders with little change noted in the aggregate. Awards and inquiry in this district continue quiet. The mar-

(*Concluded on Page 85*)

Awards Compared

	Tons
Awards this week	**14,112**
Awards last week	**11,291**
Awards two weeks ago	**3,055**
Awards this week in 1930	**12,284**
Av. weekly awards 1930	**6,990**
Av. weekly awards 1931	**7,551**
Av. weekly awards, Feb.	**5,251**
Total awards to date, 1930	**61,614**
Total awards to date, 1931	**83,060**

Strip

March Tonnage Is in Excess of February—Price for Second Quarter Not Given Test

STRIP PRICES, PAGE 77

Pittsburgh—Strip business shows a further small increase and incoming tonnage so far in March is moderately ahead of February. Announcement of an advance of $1 a ton on hot strip and $2 on cold strip has not stimulated second quarter contracting materially and the advance as yet is untested. Producers are endeavoring to place the market on a flat 1.60c and 1.70c basis for hot strip and 2.35c for cold rolled strip. Holders of first quarter contracts are being notified that specifications must be received by March 15. Mill operations are slightly higher with some hot mills up to 65 per cent this week. Cold strip demand has been relatively less active than that for hot strip and production is lower at 35 to 40 per cent.

New York—The general advance in strip prices has stimulated specifications on current contracts. Pending greater test, hot strip may be quoted 1.55c to 1.60c, Pittsburgh, for wide and 1.65c to 1.70c for narrow. Deliveries have been moved back slightly, mills offering 10 days to two weeks on hot-rolled in most instances and around three weeks on cold-rolled.

Philadelphia — Specifications for steel strip have been slightly stimulated by the recently announced advance for second quarter delivery. Present quotations are 1.55c to 1.60c, Pittsburgh, for wide hot-rolled and 1.65c to 1.70c for narrow. Cold-rolled is 2.25c to 2.35c, Pittsburgh.

Youngstown, O.—Important makers of hot and cold-rolled strip in this district have followed the recently-announced price advance of $1 a ton on hot and $2 on cold-rolled. The advance appears to be holding on the hot material, but a number of smaller cold-rollers are non-commital and one important outside interest is not making public its price attitude. Makers of hot-rolled hold to 1.70c, Pittsburgh, while cold-rolled is 2.35c to 2.45c, Pittsburgh and Cleveland. Clarification of the strip market is expected to come through expected early quotation on second quarter needs of eight important automotive interests. These quotations have been asked for by March 15.

Cleveland—A leading seller of strip in this territory has announced an advance of $1 on hot and $2 on cold-rolled strip for second quarter, completing the advance announced by several last week. Some automotive stamping work and commitments by the local automobile body plant have expanded strip sales slightly over the past week, though the increase is not marked and the market suffers from runs of spottiness. Current prices are on the basis of 2.25c, Cleveland and Pittsburgh, for cold strip; 1.55c and 1.65c, Pittsburgh, for wide and narrow hot, respectively. Sellers report inquiry for next quarter is small.

Warehouse Sales Fail to Respond Seasonally

Warehouse Prices, Page 99

New York—Demand is better for strip and cold-rolled products at unchanged and steady prices. Warehouse volume in general holds to the recent rate. Building demands improve slowly.

A leading jobber has announced increase in quantity differentials which results in some price reduction on heavier weights applying to bars, bands, blue annealed sheets, hoops, plates and structurals.

Philadelphia—Jobbing demand is spotty, with gains slight. Prices are fairly steady although lacking test.

Buffalo—Warehouses report February demand for iron and steel ran considerably ahead of that for January, with the March outlook being brightened by prospects that building season will be considerably earlier than usual.

Pittsburgh—Demand is moderately heavier than a month ago although still seasonally restricted. Materials for building construction continue dull. Prices are unchanged and fairly steady.

Cleveland—Further easing in demand for iron and steel warehouse products is noted. Most jobbers report February business at a somewhat lower rate than January. Purchasers have not opened up as they should seasonally in commitments. Prices continue nominally unchanged and fairly firm with the exception of galvanized sheets now quotable at 4.00c from stock.

Detroit—With a little more interest in public building and improvement from the automotive interests, movement of steel from stock is slightly better thus far in March in comparison with February.

Cincinnati—Warehouse business is showing no change from levels established in the last two months. Jobbers look to imminent building operations for a seasonal upturn.

Chicago—Contrary to expectations, warehouse sales the first week in March made no gains over late February. Several warehouses are announcing adjustments in 36 and 42-inch widths of one-pass cold-rolled box annealed sheets, and 36 and 42-inch galvanized sheets, due to the new width extras.

St. Louis—Seasonal requirements are being felt and are materially assisting business of sellers of steel commodities from store. New orders and specifications in hands of local interests assure a heavier volume of shipments in March than in a number of months. Purchasing though is mainly in small quantities. Prices are steady to firm. Some irregularity is noted in nails, but no change in list quotations.

Second Quarter Bolt, Nut, Rivet Prices Reaffirmed

Bolts, Nuts, Rivets Prices, Page 77

Pittsburgh—Producers of bolts, nuts and rivets are offering second quarter contracts at current levels of 73 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets. Week's specifications are at the rate of recent weeks. Orders are restricted in size as well as number.

New York—Consumers of nuts and bolts are renewing contracts at unchanged prices of 73 off list. They are contracting for rivets at 2.75c, Pittsburgh. Mason & Hanger, New York, are low on the Boston traffic tunnel, which will require 250 tons of $\frac{3}{4}$-inch bolts.

Philadelphia — Demand for bolts and nuts is sluggish and prices are easy at 73 off list. This discount has been reaffirmed for second quarter. Rivets are unchanged at 2.75c, Pittsburgh.

Cleveland—Bolt and nut producers locally have received several good releases from automotive interests which will eat heavily into banks of semifinished stock. During the past week the leading maker of rivets affirmed the current 2.75c, Cleveland and Pittsburgh base, on rivets.

Chicago—A number of second quarter contracts for bolts and nuts have been signed on the basis of 73 per cent off. Specifications are about equal to February. Fewer concessions are noted among jobbers. Structural rivets are quoted 2.85c, Chicago, in carload lots.

Concrete Bars

(*Concluded from Page* 81)

ket on billet bars usually is 1.90c, Pittsburgh, for cut lengths.

Cleveland—Some 500 tons of reinforcing bars are actively pending for a dam in Springfield township. Huron road hospital plans are out, architect for which is George S. Rider.

Chicago—Reinforcing bar market shows improvement. About 10,000 tons is being figured, including road work. Rail steel reinforcing bar quotations are 1.60c to 1.75c, but 1.90c is obtained for less-carload lots. The 2.00c price for billet bars has been strengthened. A 450-ton school project has just been let. Important road work is being closed.

Contracts Placed

5000 tons, roadwork, Oklahoma highway commission, Oklahoma City, to Sheffield Steel Corp., Kansas City, Mo.

3000 tons, retaining wall for airport, Lake Pontchatrain, New Orleans, to Laclede Steel Co., St. Louis.

1350 tons, additional to reported 100 tons in STEEL of March 5, for federal penitentiary, Lewisburg, Pa., to Sweet's Steel Co., Williamsport, Pa.

800 tons, three contracts: Route 40, section 5; route 47, section 1A and 2A; route 47, section 3A, State of New Jersey, all to Truscon Steel Co., Youngstown, O., through Edward H. Ellis Inc., general contractor.

700 tons, four barrack buildings, Langley field, Va., to Southern General Fireproofing Co., Atlanta, Ga.; Batson-Cook Co., West Point, Ga., general contractor.

450 tons, Verdi school, Chicago, to Concrete Steel Co., Chicago.

305 tons, plaza section, Port Richmond, N. Y., approach to Kill Van Kull bridge, Bayonne-Staten Island, to McClintic-Marshall Corp., Bethlehem, Pa., through Merritt, Chapman & Scott, general contractors.

300 tons, bridges and highways, Connecticut, to unstated distributor.

250 tons, overhead bridge, Blanchard, Skagit county, Wash., to Northwest Steel Rolling Mills, Seattle.

235 tons, Mercy hospital, Davenport, Iowa, to Concrete Steel Co., Chicago.

225 tons, inspection sheds, Bronx yards, board of transportation, New York, to Carroll McCreary Co. Inc., Long Island City, N. Y., through George Brady Co., general contractor.

206 tons, St. Edward's Seminary buildings, Seattle, to Northwest Steel Rolling Mills, Seattle.

203 tons, Fremont high school, Oakland, Calif., to W. S. Wetenhall Co., San Francisco.

190 tons, Veterans' hospital, Gulfport, Miss., to Kalman Steel Co., Chicago; previously reported to unstated fabricator.

152 tons, memorial building, University of California, Berkeley, Calif., to Concrete Engineering Co., San Francisco.

150 tons, building for Mellon institute, Pittsburgh, to Metzger-Richardson Co., Pittsburgh.

138 tons, bridges and highways, federal aid project, Mississippi, to Nashville Bridge Co., Birmingham, Ala.; C. G. Kershaw Contracting Co., Birmingham, general contractor.

133 tons, bridges and highways, federal aid project, Georgia, to Ingalls Iron Works, Birmingham, Ala.; C. G. Kershaw Contracting Co., Birmingham, general contractor.

125 tons, army engineers, Milwaukee, to Inland Steel Co., Chicago.

100 tons or more, mill buildings, Clark Thread Co., Austell, Ga., to Campbell Coal Co., Atlanta, Ga.; A. K. Adams & Co., general contractor.

100 tons, foundations, west side highway, New York, to Truscon Steel Co., Youngstown, O.; Sherwin & Co., general contractor.

Contracts Pending

1275 tons, Somers Point-Ocean City, N. J., bridge.

1000 tons, cross-over, Interborough drive, Queens, N. Y.

500 tons, dam, Springfield township, Mahoning county, Ohio, for Ohio Water Service Co.

416 tons, paving, Monterey county, Calif.; bids March 25.

383 tons, bridge, Louisiana highway commission; bids March 17.

300 tons, school building for College of Holy Name, Oakland, Calif.; bids received.

300 tons, rail steel bars, Camden, N. J., post office; Agoslini Bros., New York, low.

260 tons, paving and miscellaneous construction, Kill Van Kull bridge, Bayonne, N. J., to Staten Island; bids March 23. Work also includes approximately 23,000 feet steel railing, 350,000 feet reinforcing trusses and 35 tons of structural steel.

248 tons, paving work, San Diego county, Calif.; bids March 25.

222 tons, two locks, dam No. 15, Mississippi river; bids March 23, U. S. engineer office, Rock Island, Ill.

200 tons, apartment, Alameda, Calif.; bids received.

200 tons, exchange building, New York Telephone Co., Buffalo; bids in.

170 tons, Women's hospital, Philadelphia; Wark & Co., Philadelphia, low on general contract.

158 tons, bridge, Louisiana highway commission; bids March 17.

150 tons, Marine barracks, Broad street, Philadelphia; revised bids asked.

140 tons, science building, Golden Gate park, San Francisco; bids in.

130 tons, shapes and bars, bridge, Webster avenue, route 4, section 3, New Jersey state highway commission; bids March 23.

110 tons, highway route S1, section one.

105 tons, bridge over Atlantic City railroad, borough of Folsom, N. J.; bids March 30.

102 tons, subway under Southern Pacific tracks, Santa Ana, Calif.; bids received.

100 tons, Raritan arsenal, New Jersey; bids in.

100 tons, bridge alterations, Sunrise highway, Queens, N. Y.

Unstated tonnage, Huron road hospital, Cleveland; plans out. George S. Rider Co., Cleveland, architect, bids March 20.

Unstated tonnage, 6-story tuberculosis sanitarium, Warrensville, O., for city of Cleveland; bids April 10. Estimated cost, $550,000.

Pipe

Steel Line Placed in West Takes 30,000 Tons, with 20,000 Tons Pending—Cast Active in East

PIPE PRICES, PAGE 99

New York—Bids will be taken March 18 on approximately 3500 tons of cast iron pipe, yard stocks, Brooklyn. This is the third New York borough to inquire for first half requirements. Manhattan and Richmond needs are yet to be bought.

Buffalo—Negotiations between the Western New York Water Co., now subsidiary of the Federal Water Co., and the village of Kenmore, covering a ten-year contract, are nearing a final stage and a contract may be signed shortly. After signature utility company will purchase pipe, as yet unestimated.

Pittsburgh—Sentiment in the market for tubular products has improved, with better business looked for shortly. Considerable tonnage is involved in pending line pipe products.

Chicago—Chicago board of public works has received bids for 16,000 tons of 30. 36 and 48-inch cast pipe. The low domestic bids were $40.65 to $42, delivered. For the first time, a bid for French pipe was submitted in Chicago lettings. The French delivered prices were $38.36 to $39.30 on the basis of water shipment. It is understood domestic bids will be accepted because of deliveries wanted.

Cast Pipe Placed

2500 tons, high tensile 42-inch Class B and C for East 80th street, Seattle, to United States Pipe & Foundry Co., Burlington, N. J.

3840 tons, 4 to 20-inch, mostly 8-inch, yard stocks, Queens, N. Y., to R. D. Wood & Co., Florence, N. J.; United States Pipe & Foundry Co., Burlington, N. J., and Central Foundry Co., Dewey Bros., Goldsboro, N. C., low on fittings; Flockhart Foundry Co., Newark, N. J., low on valve box castings.

3500 tons, various sizes, water pipe, for Manilla, P. I., to American Cast Iron Pipe Co., Birmingham, Ala.

2264 tons, 6 and 20-inch class B, Long Beach, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

1800 tons, special cast pipe and fittings for Chicago sanitary district sewage disposal plant, to unstated interest, through S. A. Healy Co., Detroit.

850 tons, Brockton, Mass., 24-inch, to Corcoran Supply Co., Boston.

833 tons, 6-inch Class B, Los Angeles, to Pacific States Cast Iron Pipe Co., Provo, Utah.

757 tons, 12 to 16-inch class C pipe, for Whitefish Bay, Wis., to Glamor-

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WYCO STEELS

gan Pipe & Foundry Co., Chicago, at $40.30 a ton; also 5 tons, 6-inch, and 4 tons, 8-inch at $41.30.

600 lengths, Brockton, Mass, 16 feet long, 24-inch, to American Cast Iron Pipe Co., Birmingham, Ala.

200 tons, Quincy, Mass., 4 to 10-inch, to Donaldson Iron Co., Emaus, Pa.

150 tons, 16-inch cast pipe for Fort Dodge, Iowa, to American Cast Iron Pipe Co., Birmingham, Ala.

125 tons, Newton, Mass., 6 and 8-inch to Warren Foundry & Pipe Co., Phillipsburg, N. J.

100 tons, Medford, Mass., 6 and 8-inch, to Warren Foundry & Pipe Co., Phillipsburg, N. J.

40 tons, Brockton, Mass., 6-inch to R. D. Wood & Co., Florence, N. J.

Steel Pipe Placed

20,000 tons, 81 miles of 26-inch gas pipe for Southern Fuel Co., Los Angeles, to A. O. Smith Corp., Milwaukee; 30,000 tons additional for 129 miles not yet placed.

Cast Pipe Pending

16,000 tons, 30, 36 and 48-inch cast for Chicago; James B. Clow & Sons, Chicago, and United States Pipe & Foundry Co., Birmingham, Ala., low at $40.65 to $42, delivered; French bid for water delivery also submitted at $38.36 to $39.30 by George J. Halligan Supply Co., Chicago.

8000 tons, 20 to 54-inch class C water pipe, Milwaukee; will soon advertise for bids. Estimated cost, $325,000.

4835 tons, 8 and 12-inch, yard stocks, Brooklyn, N. Y.; 673 tons, special castings and fittings; 275 tons, hydrants; 1072 valves, mostly 6 and 8-inch; bids on all materials March 18.

750 tons, 8-inch, for Clinton hospital and Dannemora prison, New York; bids March 24 on three classes.

600 tons, 4 to 12-inch, for Bellingham, Wash.; bids March 12.

515 tons, 24-inch Class B, Vallejo, Calif., C. G. Claussen & Co., low.

410 tons, Wellesley, Mass., bids closed March 9; Warren Foundry & Pipe Co., Phillipsburg, N. J., low.

400 tons, Yakima, Wash., improvement; bids in.

185 tons, 3 to 12-inch class C, for Neenah, Wis.; bids close March 11.

150 tons, mostly 8-inch, for Panama Canal; bids opened March 27.

105 tons, 30-inch, dam No. 15, Mississippi river, bids March 23, U. S. engineer office, Rock Island, Ill., also 1300 feet, 2-inch wrought iron pipe.

100 tons or more, water mains, Barksdale field, Shreveport, La.; bids March 17.

Steel Pipe Pending

62,000 tons, from Cutbank area of northern Montana gas field to Butte and Anaconda, Mont., inquiry as printed in STEEL of Oct. 30, 1930, revived with signing of contracts between Anaconda Copper Mining Co. and Montana Power Co. Expenditure entailed, $10,000,000 to $12,000,000.

5500 feet, welded steel pipe, depot quartermaster, Marine Corps., Philadelphia, bids March 13.

3320 linear feet, (206 sections), electrically welded steel dredging pipe, for United States engineers, St. Louis; bids closed March 11.

200 tons, 66-inch steel pipe, municipal incinerator, Ward island, New York; W. H. Gahagan, 147 Remsen street, Brooklyn, N. Y., low on general contract.

Wire

Leading Interest Announces $2 Advance — Demand S l o w— Snows May Increase Buying

WIRE PRICES, PAGE 77

Chicago—Horizontal advances for second quarter of $2 a ton are being inaugurated by the leading interest on all wire products with the exception of fencing and bale ties. Virtually no inquiry is out as yet for that period. Demand prospects have improved in some of the drought areas because of recent snows. Orders have made no perceptible gain during the last ten days. Nails have been quoted nominally at $1.95, Chicago or western mills, to jobbers.

Pittsburgh — While independent makers of wire products have not announced price increases for second quarter as yet, they are expected to follow the action of American Steel & Wire Co. which has just raised its quotations for that period $2 a ton except on fencing and bale ties. All wire products remain slow despite a slight increase in demand since a month ago. Automotive requirements improve gradually. Jobbing products remain slow. Current quotations are $1.90 to $2 for wire nails, 2.20c to 2.30c for plain wire and $35 for wire rods.

Worcester, Mass.—A slightly increased tempo is apparent in the wire market although unusually severe weather threatens to stifle temporarily the expected advance from building and road construction. Volume is improving over the first two months. Prices are holding at 2.40c, base Worcester, for plain bright wire to dealers.

Cleveland — An important wire seller has announced higher prices for second quarter at 2.00c to the jobbing interests on nails and 2.10c a keg to the general trade. Annealed jobbing fence wire is advanced to 2.45c. Wire rods and plain wire are reported to be advanced likewise $2 a ton. As yet other producers have not followed though it is expected they will take similar action. Current business is fair at about the rate of the past eight to ten weeks. County jobbers' orders continue good. Wire fencing is unchanged at $65 a ton, Cleveland and Pittsburgh base.

Ingot Operations Up to 56 Per Cent This Week

Youngstown, O. — Twenty-seven open hearths are melting for independents, a gain of one from last week, with schedules varying from day to day. Corporation ingot output remains at 50 per cent. Furnaces in some cases are being banked and restarted on short notice as requirements from rolling mills fluctuate. Sheet mill production still is fluctuating. Output this week probably will be at 50 per cent of capacity, a gain of five points from last week. Interests report unchanged operations with Republic Steel still at 58, Carnegie at 50, both figures applicable only to this district, and Newton Steel averaging 70 per cent at Newton Falls and Monroe plants. Bessemer steel production, going into butt weld pipe for spring building, offsets a slight decline in open-hearth steel production for Republic.

Philadelphia—Eastern ingot operations are unchanged at approximately 53 per cent capacity with a leading interest operating at 56 per cent of capacity.

Buffalo — District steelworks are down to 54 per cent of capacity this week, compared with recent averages of 57 to 59 per cent. A further curtailment to about 52 per cent is said to be planned for next week. Lack of orders for heavier materials to rebuild diminished backlogs for rails and structurals is responsible for curtailment, which leaves 20 open-hearths in production.

Pittsburgh—Ingot production now is up one point to 50 per cent, but blast furnace schedules hold at 21 active steelworks' stacks of the 54 in the district. Sheet output continues at 45, with tin plate unchanged at 75. Strip operations are higher at 60, while pipe and wire remain at 35.

Cleveland—Ingot operations have jumped seven points over last week to 65 per cent of capacity with the addition of two more open-hearth furnaces, making 22 of the district's 34 now in operation. This is the highest rate since June 10, 1930.

Chicago—Most steelworks are increasing open-hearth capacity this week, making the operating rate 57 to 58 per cent, a gain of two to three points. Of the finishing mills, plate departments have made the most marked advances. This rate is 60 per cent, against 50 a week ago.

Birmingham, Ala.—Practically all open hearths in the district are in shape for operation. No change is current in operation, 65 per cent of capacity holding. Finishing mills schedule also are maintained.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.00
Pittsburgh, delivered	17.63 to 18.13
Valley furnace	17.00
Cleveland fur., local del.	17.50
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	16.51 to 17.01
Alabama, del. St. Louis	14.92 to 15.42
Alabama, del. Cincinnati	14.19 to 14.69
Ala., Phila., dock del.	15.75 to 16.25
Ala., Balt., dock del.	15.50 to 16.00
Ala., Balt., dock del.	15.50 to 16.00
Alabama, New York dock	16.00 to 16.50
Ala., Boston dock del.	16.25 to 16.75
Tenn., Bir. base, local del	13.00
Tennessee, del. Cinn.	14.19 to 14.69
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	18.76 to 19.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.50
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13
Eastern Penn., del.	17.25 to 17.75
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley, furnace	16.50

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 27.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.00
Pittsburgh district fur.	16.50
Pittsburgh, delivered	17.13 to 17.63

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50
Connellsville foundry	3.25 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.75
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	23 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$43.00
Georgia, Alabama	40.00 to 47.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00 to 38.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	35.30 to 36.30
Chicago	31.00
Forging, Chicago	36.00
Forging, Pittsburgh	36.00
Forging, Philadelphia	40.30 to 41.30

SHEET BARS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	160.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

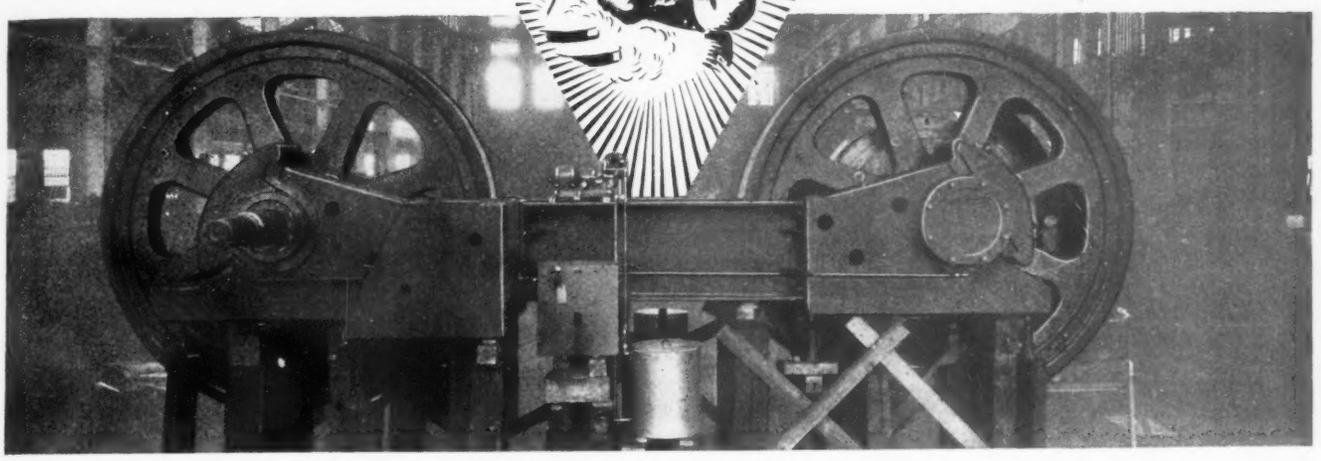
*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$14.00
Washed gravel, import duty paid east, tide, gross ton	19.00 to 19.50

SUPERIORITY at a SAVING



THE economy and superiority of riveted or welded structural steel is being recognized in a rapidly widening variety of uses and fields, particularly in the manufacture of machinery bases and frames.

Pictured above is a hoist made for the Clover Splint Coal Company by the Nordberg Manufacturing Company. 36″ x 230 lbs. CB (Carnegie Beam) Sections were used for the center frame. By this elimination of a casting, the savings in weight was approximately 40%. Further savings were made, both in the time that ordinarily would have been required for pattern preparation and in the cost of such patterns. The use of structural steel eliminates the capital investment, overhead and operating expenses of a pattern shop, patterns in storage and foundry. Instead, you have only a small stock pile of selected rolled steel shapes, available for instant use and capable of being fabricated into an endless variety of machine parts.

The time between design and delivery is materially shortened. Rolled steel is homogeneous, tough, and its strength is high in proportion to its weight and bulk. C B Sections have added a new impetus to this modern method of machine construction because of their unique advantages. Carnegie Engineers are at your service at all times and will gladly consult with you regarding the use of structural steel in machine construction.

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CARNEGIE STEEL COMPANY
PITTSBURGH, PA.

Subsidiary of
United States Steel Corporation

Pig Iron

Market Is Quieter, but Shipments Are Steady—Valley Producers Holding at $17

PIG IRON PRICES, PAGE 88

Pittsburgh—Orders for pig iron are slightly more numerous but still confined to small lots. Business is moderately heavier than a month ago while shipments also show some gains. Consumers and producers maintain small stocks. One furnace interest reports its stock the smallest in five years and some increase in operations is in prospect this month. Strictly merchant output is limited to one active stack, out of seven. Foundry operations are spotty. Orders here are being taken on the basis of $16.50, valley, for No. 2 foundry and basic, and $17 for bessemer and malleable.

Boston—About 2800 tons of pig iron was sold in this district in the past week, including 1000 tons for the General Fire Extinguisher Co., Providence, R. I. The latter order included 350 tons of Alabama iron, reported at $18, delivered. Mystic Iron Works, Everett, Mass., met the Alabama quotations.

New York—Pig iron sales in this district in the past week totaled about 6000 tons. Although an inquiry from the Worthington Pump & Machinery Corp., Harrison, N. J., is developing sharp competition prices generally are unchanged. Crane Co., Bridgeport, Conn., placed additonal iron, bringing its purchases of foundry and low phosphorus up to 2000 tons. Crompton & Knowles Loom Works, Providence, R. I., is inquiring for approximately 1000 tons for second and third quarter.

Philadelphia—The market is dull, and prices are weak. The General Steel Castings Corp.'s inquiry for 2500 tons of basic still is pending.

Rather than blow in its own Keystone furnace March 15 as once contemplated, the Reading Iron Co., Reading, Pa., is transferring iron ore to the E. & G. Brooke Iron Co.'s furnace at Birdsboro, Pa., for conversion to pig iron for the Reading company.

Buffalo—Inquiry continues small, especially in this district. Buffalo producers' prices were out of line on recent eastern inquiry and practically none of the orders came here. Prices continue firm. Little buying for second quarter is noted.

Youngstown, O.—Small lots of No. 2 foundry pig iron are being sold at $17, valley furnace. All four merchant producers in this district appear to continue at $17. One has refused a substantial order for this grade offered by a purchaser in the valley district at $16.50. The recent flurry in this market, which now appears to have subsided, seems to have been brought about by aggressive competition from northern Ohio stacks. This competition has had the effect in the valley market of suspending the usual price differentials for grade, thus reducing to the $17, valley, level No. 2 foundry, malleable and bessemer. Misunderstanding of this situation on the part of certain users seems to have caused the recent price flurry. No important basic inquiry has been noted in some time. Carload lots of basic have been going to steel foundries in this district at $17, furnace. Ten stacks are blowing out of the district's total of 34.

Cleveland—The market is quieter, with fewer inquiries for second quarter than were noted in recent weeks. A Muncie, Ind., melter who was in the market for 1000 tons has not closed, and no other substantial lots are pending. Furnace interests with headquarters in Cleveland booked approximately 9000 tons in the past week. Shipments to the automotive foundries this month are expected by one lake furnace interest to exceed the February rate by about 20 per cent. The market continues $17.50, base, furnace, for delivery in the 50-cent switching area here, and $16 to $17, base, lake furnaces, for shipment outside Cleveland, Toledo and Detroit.

Cincinnati—Only small sales of pig iron were reported in the district during the past week, with the total smaller than heretofore in 1931. Southern iron is firm at $10.50, base, Birmingham. Shipments continue fair.

Chicago—Moderate gains in the foundry melt in this district are resulting in heavier deliveries than in February. Considerable iron purchased for first quarter will be carried into the second. More inquries are noted for second quarter, and several for longer periods. Farm implement foundries still are backward. The price is steady at $17.50, base, Chicago furnace. A number of small sales of southern iron have been closed at $10.50, base, furnace, or $16.51, delivered, Chicago. A few orders for silvery iron also are noted.

St. Louis—March shipments of pig iron by a leading producer and an important southern furnace interest are likely to be the largest since last summer, from present indications. Several jobbing foundries report their position today is better than a year ago. The market is more active, and prices are firm.

Birmingham, Ala.—The reduction of $1 a ton in the price of pig iron in this district noted a week ago is more in evidence, the market being $12 to $13, base. No change is reported in the lower prices quoted for shipment to other districts. Republic Iron & Steel Corp. will complete relining No. 1 stack at Thomas, Ala., next week and will then have two units in operation in this state.

Toronto, Ont.—Spot buying is well sustained but second quarter contracts are slow. Prices are steady.

Ferroalloys Gaining with Steel Operations

Ferroalloy Prices, Page 88

New York—Ferromanganese continues unchanged at $85, duty paid, per carload, and domestic spiegeleisen, 19 to 21 per cent, at $30, furnace, in carloads. Specifications are at a rate comparable with the continued slight increase in steelmaking operations.

Special ferroalloys outside of the manganese group show no change. Shipments are holding the gains made earlier in the year. Tungsten is in a dull market, with futures quoted about $3.25 a short ton unit in bond, but it is said that any one would have difficulty in buying a fair quantity at this price for a definite shipment. Spot is held somewhat higher. Supplies of tungsten steel scrap are large.

Pittsburgh — Specifications for ferroalloys are slow to expand. Shipments of ferromanganese and spiegeleisen are increasing at a rate corresponding to the gradual upturn in steelmaking operations while demand for other ferroalloys shows only a moderate increase since the first of the year. Prices are unchanged with small lots of ferromanganese continuing $89.79, delivered, and spiegeleisen $30, furnace, for small tonnages.

Will Supply Steel Tubing

Philadelphia — Edgar T. Ward's Sons Co., Philadelphia, has been recommended for the contract by the United States marine corps depot, Philadelphia, for 3000 feet of 1⅜-inch steel tubing and 12,000 feet of ⅞-inch steel tubing.

Scrap

Small Change Evident in Demand as Melters Take Negligible Tonnage—Prices Easy

Chicago — Mild strength has been imparted to the dealer position in the scrap market through higher bids for material offered by railroads, but the stronger sentiment is not being reflected in consumer quotations. Higher prices for railroad scrap are confined largely to steelmaking grades. Cupola, malleable and low phos scrap are moving more slowly than for five years, but electric furnace grades are holding their price position fairly well. Heavy melting steel is nominal at $9.75 to $10.25. Reports are that a large melter is likely to purchase a substantial order in the next few days. It is known that this buyer previously has turned down $10.25. Recent railroad sales have been on the basis of about $10, gross, on tracks.

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.75 to 7.00
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	9.50 to 9.75
Chicago	9.75 to 10.25
Cinci., deal.	9.50 to 10.00
Cleve., No. 1	10.00 to 10.50
Cleve., No. 2	9.75 to 10.00
Det., No. 1 deal.	9.00 to 9.25
Det., No. 2 deal.	7.00 to 7.50
E. Pa. del. mill	10.00 to 11.00
N. Y. del. R. R.	7.00
N. Y. deal. No. 2	5.50
N. Y., deal. yd.	5.00
Pitts., No. 1	12.75 to 13.25
St. L. No. 1 sel	10.50 to 11.00
Federal, Ill.	9.00 to 9.50
Granite C., Ill.	8.50 to 9.00
Valleys, No. 1	12.00 to 12.50

COMPRESSED SHEETS

Buffalo, dealers	9.50 to 9.75
Chicago	8.50 to 9.00
Cleveland	9.00 to 9.25
Detroit, dealers	9.00 to 9.50
E. Pa. new mat	9.00 to 10.00
Pittsburgh	12.75 to 13.25
Valleys	12.00

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.75 to 9.25
Cleveland	7.00 to 7.25
Eastern Pa.	9.00
Pittsburgh	11.50 to 12.00
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.00 to 5.50
Cincinnati	5.00 to 5.50
Detroit, dealers	6.00 to 6.50
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.00
Buffalo	13.75 to 14.25
Chicago (3 ft.)	11.00 to 11.50
Chicago (2 ft.)	12.00 to 12.50
Cinci., deal.	14.25 to 14.75
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	13.00 to 13.50

STOVE PLATE

Birmingham	8.00 to 8.50
Boston, con.	8.00 to 8.50
Buffalo	9.50 to 10.00
Chicago, net	7.75 to 8.25
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00 to 9.50
N. Y., deal. mill	4.75
St. Louis	8.00 to 8.50

COUPLERS, SPRING

Buffalo	13.50 to 14.00
Chicago	12.00 to 12.50
Eastern Pa.	16.50
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00

ANGLE BARS—STEEL

Chicago	11.00 to 11.50
St. Louis	9.50 to 10.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	16.50 to 17.00
Eastern Pa.	17.00
Pittsburgh billet bloom crops	17.50 to 18.50
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.50 to 11.00
St. Louis	10.00 to 10.50

SHOVELING STEEL

Chicago	9.75 to 10.25
Cleveland	7.00 to 7.25
St. Louis	9.00 to 9.50

RAILROAD WROUGHT

Birmingham	9.00 to 10.00
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.50 to 9.00
Buffalo, No. 2	10.75 to 11.25
Chicago, No. 1	9.00 to 9.50
Chicago, No. 2	9.75 to 10.25
Cinci., No. 2	9.50 to 10.00
Eastern Pa.	11.00
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.50 to 13.00
St. Louis, No. 1	7.50 to 8.00
St. Louis, No. 2	9.00 to 9.50

SPECIFICATION PIPE

Boston	6.50 to 7.00
Eastern Pa.	11.50 to 12.00
N. Y., deal.	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.50 to 9.75
Chicago, No. 1	8.00 to 8.50
Cinn., No. 1 dl.	8.00 to 8.50
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	6.50 to 7.00
Det., No. 1 new deal.	8.00 to 8.50
St. L., No. 1	6.50 to 7.00
Val. new No. 1	11.00 to 11.50

MACHINE TURNINGS

Birmingham	7.00 to 7.50
Boston, dealers	2.00 to 2.50
Buffalo	6.00 to 6.50
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.75 to 5.25
Detroit	4.00 to 4.50
Eastern Pa.	7.00 to 7.50
N. Y., deal.	3.00
Pittsburgh	7.75 to 8.00
St. Louis	4.00 to 4.50
Valleys	8.50 to 8.75

BORINGS AND TURNINGS For Blast Furnace Use

Boston	2.00 to 2.60
Buffalo	6.75 to 7.25
Cinn., deal.	4.50 to 5.00
Cleveland	7.00 to 7.25
Detroit, deal.	4.75 to 5.25
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	7.00 to 7.50
Boston, chem.	9.10 to 9.60
Boston, deal.	2.00 to 2.50
Buffalo	6.75 to 7.25
Chicago	4.50 to 5.00
Cinn., deal	4.50 to 5.00
Cleveland	7.00 to 7.25
Detroit, deal.	4.75 to 5.25
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	13.50 to 14.50
N. Y., deal.	3.50
Pittsburgh	7.50 to 8.00
St. Louis	6.00 to 6.50

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.25 to 7.75
Chicago, net	7.00 to 7.50
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	7.50 to 8.00

FORGE FLASHINGS

Boston, deal.	5.50 to 6.10
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	8.00 to 8.50
Detroit	7.75 to 8.25

FORGE SCRAP

Boston, del.	5.10 to 5.60
Chicago	12.50 to 13.00
Eastern Pa.	10.50 to 11.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	11.50 to 12.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	10.50 to 11.00
Chi., steelworks	7.50 to 8.00
Cleveland	8.00 to 8.50
Eastern Pa.	11.00
Pittsburgh	11.50 to 12.00
St. Louis	7.50 to 8.00

STEEL CAR AXLES

Birmingham	14.00 to 14.50
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	14.00 to 14.55
Eastern Pa.	18.50 to 19.50
St. Louis	14.50 to 15.00

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	12.90 to 13.45
N. Y., deal.	13.00 to 14.00
St. Louis	12.00 to 12.50
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 11.00
Boston, iron	14.00 to 14.50
Buffalo, iron	13.00 to 13.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	10.75 to 11.25
Chi., roll steel	13.50 to 14.00
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.50 to 16.00
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.50 to 14.00
Pitts., steel	16.00 to 16.50
St. Louis, iron	10.00 to 10.50
St. Louis, steel	12.50 to 13.00

NO. 1 CAST SCRAP

Birmingham	11.00 to 11.25
Buffalo (mach.)	10.50 to 10.75
Boston, textile	9.00 to 9.50
Chicago, mach.	10.65 to 11.20
Chi., railroad	10.10 to 10.65
Chicago, agri.	9.50 to 10.10
Cinn., mach. cup., gross	13.00 to 13.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	13.00
N. Y. cup. deal.	8.00 to 8.50
N. Y., del. local foundries	12.00
Pitts., cupola	12.50 to 13.00
San Fran., del.	13.50 to 14.00
Seattle	8.50 to 9.00
St. L. No. 1 ma.	9.75 to 10.25
St. L. No. 1	9.00 to 9.50

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	7.00 to 7.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 7.50
Pittsburgh	9.50 to 10.00

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	12.00 to 12.50
Chicago, agri.	10.50 to 11.00
Chicago, R. R.	12.00 to 12.50
Cinn., R. R. dl.	11.50 to 12.00
Cinn., agri., dl.	12.00 to 12.50
Cleve., rail	12.00 to 12.50
Det. auto deal.	11.00 to 11.50
St. Louis, rail	10.00 to 10.50

RAILS FOR ROLLING 5 feet and over

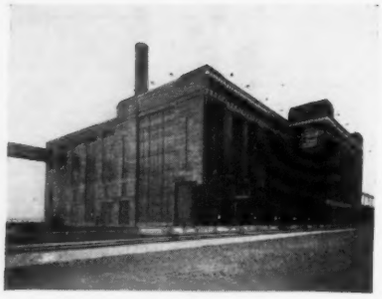
Birmingham	11.00 to 11.25
Boston	8.50 to 9.00
Buffalo	10.25 to 10.75
Chicago	12.00 to 12.50
Eastern Pa.	13.00 to 13.50
New York	9.00 to 9.50
St. Louis	10.75 to 11.25

LOCOMOTIVE TIRES

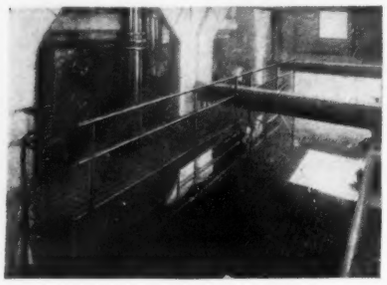
Chicago, cut	13.00 to 13.50
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

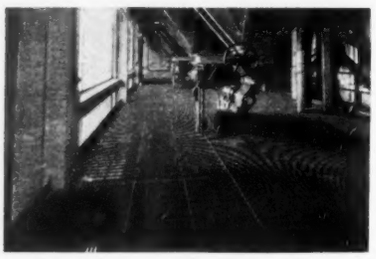
Chicago	11.25 to 11.75
Buffalo	14.00 to 14.50
Eastern Pa.	15.50 to 16.50
Pittsburgh	15.50 to 16.00



An exterior view of Deepwater Station at Penns Grove, New Jersey.

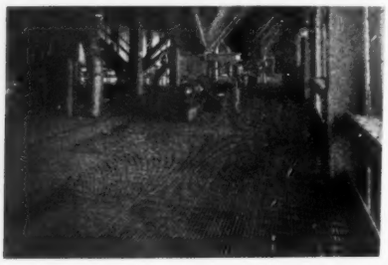


A view of the front of boiler No. 6 in Deepwater, showing Mitco Grating in the flooring and in the platform (for access to burners) in front of the boiler.



Another view in the boiler house at Deepwater, showing the mill feeders and magnetic separator in the foreground, coal bunkers overhead, and fuel pipes to burners on the extreme right. The flooring is Mitco Grating.

Walkway and ramp of Mitco Grating, running past the slag tap door on the south side of No. 6 boiler in Deepwater. The ramp runs from the firing floor to the motor generator floor.



Looking south in the boiler house at Deepwater, showing the mill feeders and magnetic separators in the foreground, with coal bunkers overhead. Here also the flooring is Mitco Grating.

Mitco Grating in the firing floor at Deepwater. The view was taken looking north in the boiler house, showing control panels on the left and boilers and burners on the right.

At Deepwater 1200 LB. STEAM PRESSURE STATION AT PENNS GROVE, N. J.

70,000 Square Feet of MITCO *Interlocked Steel* GRATING

AN ACHIEVEMENT in design, construction and operation, Deepwater Station at Penns Grove, New Jersey, possesses many features of unusual engineering interest. It is, for example, the first large station in which all boilers are designed for operation at 1200 lb. steam pressure.

Designed and constructed by Stevens and Wood, Incorporated, Deepwater is owned jointly by American Gas and Electric Company and United Gas Improvement Company interests. It is operated by Deepwater Operating Company.

Throughout Deepwater Station, 70,000 square feet of Mitco Interlocked Steel Grating are installed, furnishing the maximum measure of light and ventilation from level to level, in combination with non-slipping and non-clogging under-foot surfaces, and the requisite flooring strength and rigidity. The selection of such a vast area of Mitco Grating for installation in this outstanding achievement in central stations is significant.

Before you select open steel flooring, investigate Mitco Interlocked Steel Grating and the superiorities which have earned its classification as the grating with every advantage. Write for bulletins.

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Makers of Mitco Shur-Site Treads, Mitco Armorgrids, Hendrick Perforated Metal Screens and Elevator Buckets, Hendrick Perforated Metal Grills and Light and Heavy Steel Plate Construction.

MITCO *Interlocked Steel* GRATING

The Grating With Every Advantage

High Strength—Permanent Rigidity—Non-Slipping, Non-Clogging Surface—Light and Ventilation

A more bullish sentiment results also from the gradually increasing steelworks operations in the Chicago district.

Boston—Factors in the steel and iron scrap situation have changed little. Not much tonnage has been moved and stocks are low. Prices are so low that producers are slow to sell their accumulations.

New York—Scrap buying is generally limited to a few carloads. Some increase is reported in demand from the Pittsburgh district. An eastern Pennsylvania mill is taking fair size commitments against contract. Dealers' buying prices are steady and unchanged. Heavy melting steel remains nominally $10.50, delivered, eastern Pennsylvania. Accumulations are not large, according to dealers.

Philadelphia—Dullness is marked in the market for steel and iron scrap. Except for consumers at Phoenixville and Harrisburg, Pa., most leading buyers of prepared scrap not only are out of the market but are holding down on shipments on contracts. Prices are nominally unchanged.

Buffalo — Worthington Pump & Machinery Corp. is in the market for 1500 tons or more of short steel rails and No. 1 machinery cast. This is the only new inquiry for scrap reported this week but Bethlehem is said to be making some additional purchases down state for delivery at Lackawanna.

Pittsburgh—Scrap is slightly more active, with the tone of the market moderately firmer. Pennsylvania railroad again rejected bids on heavy melting steel and with adverse weather tying up freight traffic, available scrap is rather limited. A moderate tonnage of heavy melting was sold at $13, and with bids on railroad scrap ranging up to $13.50, this market now is quoted 25 cents higher, or $12.75 to $13.25. Other grades generally are quiet at unchanged prices.

Cleveland—Easiness is evident in iron and steel scrap. This is not of sufficient proportion to warrant further reduction in existing quotations. A local steelworks continues to take blast furnace borings, turnings and No. 2 busheling. Movement otherwise is negligible. Movement to Warren, O., is in fair volume chief demand being for heavy melting steel and heavier grades of blast furnace scrap, such as stove plate, grate bars, etc.

Youngstown district mills are receiving little material. Valley quotations are unchanged.

Detroit—Further declines of 25 cents per ton have been made in a few grades of steel and iron scrap. Larger shipment of material from automotive sources is noted.

Cincinnati—Quotations on steel and iron scrap remain unchanged, with partial test expected within a few days by closing of bids on scrap lists of four railroads. Material is being moved freely on contracts, but new business is dull.

St. Louis—The scrap situation is affected by burdensome supplies, mainly from railroads, and the trend of prices is downward. Buying is limited, the only purchase of moment being a tonnage of No. 2 heavy melting steel by an east side melter at $9 per ton. This represents the extreme low and now this grade is quoted at $8.50 to $9, delivered at consumer's plant.

Birmingham — Lower pig iron prices have had the effect of weakening steel and iron scrap and slowing demand. Heavy melting steel is quoted at a maximum of $11, with some talk of concessions.

Toronto, Ont.—The steel and iron scrap market shows little change. Spot buying of machinery cast is gaining ground and this is the only grade showing steady advance in sales. Stove plate and malleable scrap are spotty while other iron grades are slow. Demand for steel scrap is restricted to small tonnages. Prices on all grades and descriptions are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Buys Castings at $2.90

Washington—Mississippi Foundry & Machine Co., Jackson, Miss., has been awarded the contract for 20,000 pounds of gray iron castings for the army enginneer at Vicksburg, Miss., on a bid of $2.90 per 100 pounds.

Army Places 33 Pontoons

Louisville, Ky.—Jones & Laughlin Steel Corp., Pittsburgh, has been awarded the contract for 33 pontoons at $980 each by the army engineer at Louisville. Chicago Bridge & Iron Co. was awarded 40 sections of pipe with flanges.

Coke

Little Change Noted in Market—Some Consumers Negotiating for Second Quarter

COKE PRICES, PAGE 88

Pittsburgh—Beehive coke demand generally lacks improvement. Orders for the furnace grade are in small lots, with the market for standard fuel steady at $2.50. Foundry coke consumption is little changed from a month ago and prices are firm. Demand for heating coke is quiet.

Boston — Demand for domestic coke holds to a high average, but the movement of foundry fuel is slow. Most users are specifying as required on contracts, and the spot market is quiet.

New York—Improvement in specifications for metallurgical coke continues negligible. Beehive foundry coke is easy at $2.50 to $2.65, Connellsville. Standard grades of beehive foundry coke are $3.50 to $3.75, Connellsville, with premium brands $4.70 to $4.85, Latrobe, Pa. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Cincinnati — By-product foundry coke demand is slightly improved but still far below normal. The price remains $9, delivered Cincinnati. Spot business is dull.

Birmingham, Ala.—Southern coke producers are seeking a revision of freight rates to competitive districts. Production is at about 70 per cent of capacity. Quotations on southern coke are steady.

St. Louis — Consumers in the South and Southwest are negotiating for second quarter requirements. The melt has increased in this district and shipments are gaining. Prices are unchanged.

Pacific Coast

Broader Demand Is Manifested —Pipe and Transmission Lines Require Plates and Shapes— Many Products Keeping Up to Record of 1930—San Francisco Warehouse Prices Lower

San Francisco—(*By Air Mail*)—A broader demand for iron and steel products was noted this week and some large tonnages were booked. Among new inquiries are 30,000 tons of plates for a pipe line and 2500 tons of structurals for a transmission line. Awards of note involved 20,000 tons of plates for a pipe line and 3000 tons of cast iron pipe. New low price levels have been established on plates, shapes and merchant bars.

Bars, Plates and Shapes

Awards of concrete bars totaled 1149 tons, bringing the aggregate for the year to 11,059 tons, compared with 8324 tons for the corresponding period last year. Gunn, Carle & Co. took 150 tons for the Seventh Street crossing in Oakland, Calif., and W. S. Wetenhall Co. booked 203 tons for a high school in Oakland. Included among pending projects are 416 tons for paving work in Monterey county, Calif., 300 tons for a school in Oakland and 140 tons for the science building in Golden Gate Park, San Francisco. Out-of-stock prices in the Los Angeles district remain firm at 2.50c, base, on carload lots, but San Francisco quotations are weak and as low as 2.40c has been named. Merchant bar steel is moving in limited quantities and prices now appear general at 2.10c, c.i.f.

A. O. Smith Corp., Milwaukee, has booked 81 miles of 26-inch gas pipe for the Southern Fuel Co., Los Angeles, involving 20,000 tons of plates. This company will also shortly award an additional 129 miles of 26-inch pipe, calling for 30,000 tons. Chicago Bridge & Iron Works, Chicago, took 100 tons for two steel tanks for the navy department at San Diego. Bids open next week on 210 tons of a 20-inch pipe line for Oakland, Calif. Plate prices are off and 2.00c to 2.05c, c.i.f., is general. Awards so far this year aggregate 26,054 tons, compared with 9151 tons for the same period in 1930.

Most structural awards involved small lots. The total for the week aggregated 1299 tons, bringing the year's bookings to 18,273 tons, compared with 19,071 tons for the corresponding period a year ago. Two bridges, one near Phoenix, Ariz., and the other near Woolsey, Nev., involving 110 tons and 100 tons, respectively, were placed with unnamed interests. California Steel Co. took 168 tons for the Webster street pier in Oakland. New inquiries call for 700 tons for a church in San Francisco, 2500 tons for a transmission line for the Southern California Edison Co., Los Angeles, and 900 tons for a hangar at Pearl Harbor. Plain shapes are now quoted at 2.05c, to 2.15c, c.i.f.

Other Finished Material

Demand for cast iron pipe is improving and the total weekly booking was the largest of the year, aggregating 6529 tons, bringing the total to 18,727 tons, compared with 16,320 tons for the same period in 1930. The Pacific States Cast Iron Pipe Co. took 833 tons for Los Angeles. The United States Pipe & Foundry Co. secured 2264 tons for Long Beach, Calif. Vallejo, Calif., has opened bids on 515 tons of 24-inch pipe.

Movement of out-of-stock material is increasing slightly but prices in the San Francisco district have again been reduced. Bars, plates and shapes are now quoted at 2.40c, base. Blue annealed sheets, No. 10 gage, are quoted at 3.65c, base, black sheets, No. 24 gage, at 4.15c., and galvanized sheets, No. 24 gage, at 4.65c., base.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Northwest Demand Better

Seattle—Interest in iron and steel products in the Pacific Northwest is more pronounced this week. Awards approximated 4000 tons. Prices are holding and the jobbing trade reports increased volume. Building is slow, unemployment continues acute but considerable public work is being placed or is up for figures. As a whole, the outlook is materially improved.

Bars, Plates and Shapes

Only two awards over 100 tons each for concrete bars were noted this week. Both were taken by the Northwest Steel Rolling Mills, Seattle, 250 tons for the 882 foot overhead Blanchard bridge in Skagit County, Wash., and 206 tons for St. Edward's seminary, near Seattle. Local mills have booked some business in car lots but inquiry for concrete bars has been slow. Mill prices are unchanged at 2.30c. Merchant bars are also moving in limited tonnages, price remaining at 2.25c.

General contract for the First avenue So., Seattle, pipe line project, involving about 350 tons of plates, 8000 feet of 3/16 inch 24 and 36-inch diameter lockbar, has been awarded to L. Coluccio, Seattle. The pipe will be fabricated by the Western Pipe & Steel Co., San Francisco.

Pacific Coast Steel Corp., Seattle, will fabricate 450 tons of shapes for a steel warehouse to be erected at the local plant. Wallace Bridge & Structural Steel Co. booked 100 tons of shapes for the Jim Creek bridge in Cowlitz county, Wash., general contract to Union Bridge Co., Portland, Oreg.

Finished Materials Gain

Jobbing houses report the month opened with more interest and activity, indicative of spring buying. Turnover is not normal but shows an improvement over January and February. Prices are unchanged. Demand for tank plates is increasing. Sheets show only normal turnover, while items used in building are moving slowly.

Cast Iron Pipe Award Made

United States Pipe & Foundry Co., through H. G. Purcell, Seattle, has taken the contract to furnish 2500 tons of high tensile 42-inch cast iron pipe for the East Eightieth street project, Seattle. Awards are pending at Yakima, Wash. for about 400 tons of cast iron pipe, bids in, while Bellingham, Wash. will receive bids March 12 for 600 tons of 4 to 12-inch.

Old Materials

The market is unchanged. Local mills are receiving ample supplies of select scrap for which the top price is $8, gross ton, both steel and cast iron. Foundries are not actively buying and there is no export demand.

Sedlin Tool & Die Works Inc., 412 North Leavitt street, Chicago, has increased capital from $25,000 to $50,000.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In	Blk.	Gal.	In.	Blk	Gal.
⅛	58	44½	⅛	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir.....$37.00 to 38.00
Four-inch, Birmingham..... 41.00 to 42.00
Four-inch, Chicago ..... 49.20 to 50.20
Six to 24-inch, Chicago..... 45.20 to 46.20
Six-inch and over, N. Y..... 37.50 to 39.50
Four-inch, New York..... 40.50 to 41.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans.	2.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.15c
Cleveland	2.25c-2.44c
Detroit	3.00c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.50c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	3.10c
San Fran.	3.65c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	4.05c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.60c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.50c
St. Louis	4.05c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.40c-4.60c
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.90c
Cleveland	4.00c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	4.15c
Pitts.**	4.00c
Portland	5.00c
San Fran.	4.65c
Seattle	5.00c
St. Louis	4.60c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.50c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter	3.80c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.75c
St. Paul (a)	3.85c
St. Louis	3.60c
Tulsa	4.75c

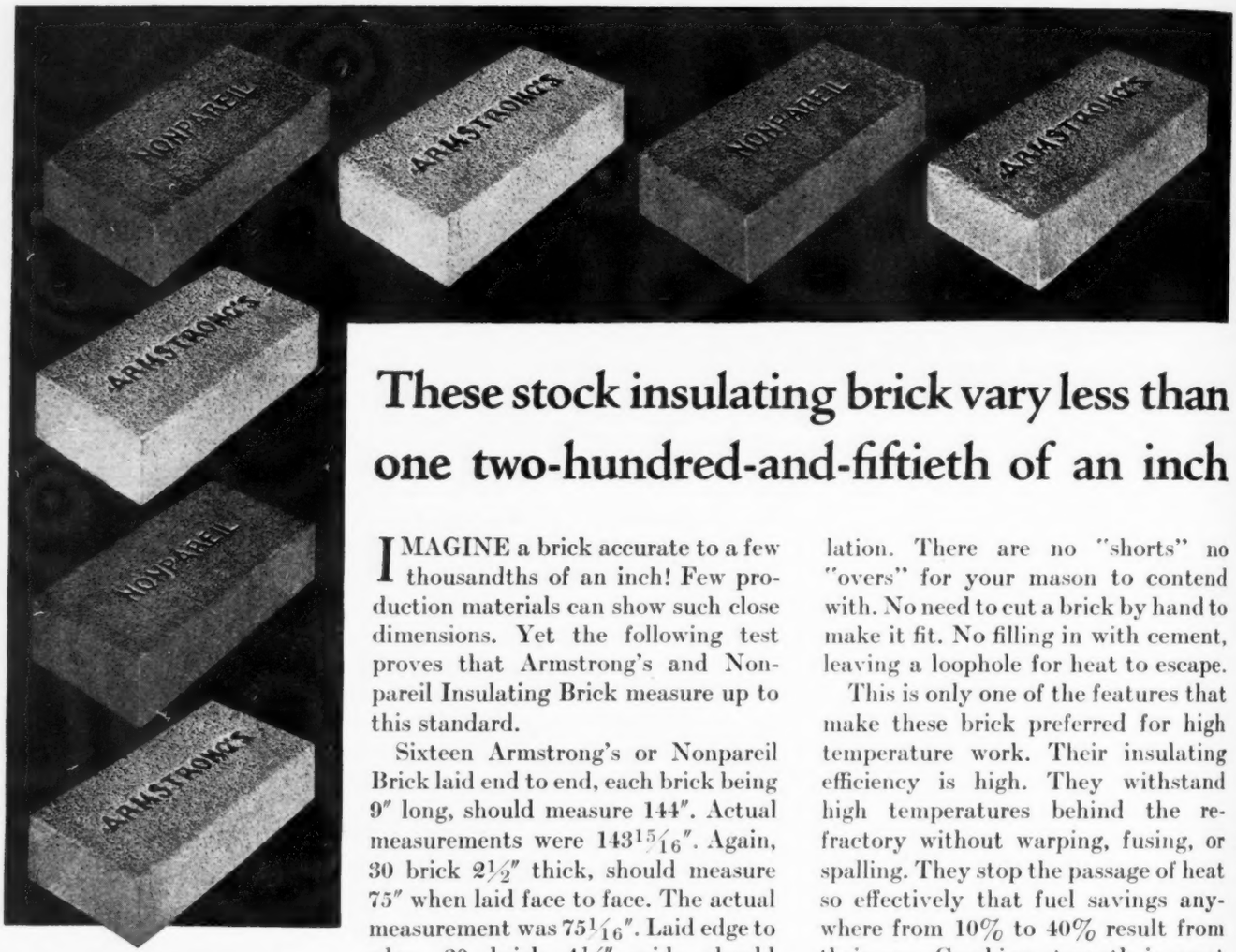
Flats and squares 5½c extra, except Tulsa, where 5.14c is quoted.
(a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c)	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

Sized to .004 *of an* INCH *!*



Two Bricks . . .
Two Jobs . . .

Armstrong's Insulating Brick are burned at temperatures over 2500° F. They will withstand equally high temperatures in any installation, back of the refractory.

Nonpareil Insulating Brick withstand temperatures up to 1600° F. behind the refractory, without warping, cracking, fusing, or spalling.

Both are machine-sized for accuracy in all flat shapes. They are furnished in standard sized bricks with special shapes and sizes to order.

These stock insulating brick vary less than one two-hundred-and-fiftieth of an inch

IMAGINE a brick accurate to a few thousandths of an inch! Few production materials can show such close dimensions. Yet the following test proves that Armstrong's and Nonpareil Insulating Brick measure up to this standard.

Sixteen Armstrong's or Nonpareil Brick laid end to end, each brick being 9″ long, should measure 144″. Actual measurements were $143\frac{15}{16}$″. Again, 30 brick $2\frac{1}{2}$″ thick, should measure 75″ when laid face to face. The actual measurement was $75\frac{1}{16}$″. Laid edge to edge, 30 brick $4\frac{1}{2}$″ wide should measure 135″. The actual figure was $134\frac{7}{8}$″.

All the brick used were *taken from stock piles* of Armstrong's and Nonpareil Insulating Brick. If you like, try the same test for yourself and you will appreciate the actual advantages of machine sizing.

Such accuracy assures economy in laying and efficient insulation. There are no "shorts" no "overs" for your mason to contend with. No need to cut a brick by hand to make it fit. No filling in with cement, leaving a loophole for heat to escape.

This is only one of the features that make these brick preferred for high temperature work. Their insulating efficiency is high. They withstand high temperatures behind the refractory without warping, fusing, or spalling. They stop the passage of heat so effectively that fuel savings anywhere from 10% to 40% result from their use. Crushing strength is great enough to withstand the strain of the highest furnace construction with plenty of margin for safety. In many instances they have been reclaimed for re-use after long service.

We will gladly send you further information and a sample brick. Just address Armstrong Cork & Insulation Co., 920 Concord Street, Lancaster, Pennsylvania.

Armstrong's (A) *Product*

Armstrong's and Nonpareil Insulating Brick

for FURNACES, OVENS, KILNS, and LEHRS

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 10.50c, Conn., for copper

Sheets	
Yellow brass (high)	17.62½
Copper, hot rolled	20.37½
Lead, full sheets (cut ½c more)	8.50
Zinc sheet (100-lb. base)	9.50
Tubes and Pipes	
Seamless yellow brass (high)	22.50
Seamless copper	22.87½
Rods	
Yellow brass (high, full turnings)	16.00
Naval brass	16.87½
Anodes	
Copper, untrimmed	17.87½
Wire	
Yellow brass (high)	18.12½

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	7.00 to 7.25
Chicago	6.75 to 7.00
Cleveland	7.50 to 7.75
St. Louis	6.25 to 6.50
Heavy Yellow Brass	
New York	4.75 to 5.00
Heavy Copper and Wire	
New York	8.00 to 8.25
Boston	7.50 to 7.75
Chicago	7.50 to 8.00
Cleveland	7.50 to 7.75
St. Louis	6.50 to 7.00
Red Brass Borings	
New York	6.50 to 7.00
Yellow Brass Tubing	
Cleveland	4.50 to 4.75
Light Copper	
New York	7.00 to 7.50
Chicago	6.75 to 7.00
Cleveland	6.50 to 6.75
St. Louis	6.50
Light Brass	
Boston	3.50 to 3.75
Chicago	4.37½ to 4.62½
Cleveland	3.25 to 3.50
St. Louis	3.50 to 3.75
Zinc	
New York	1.75 to 2.00
Cleveland	1.25 to 1.50
St. Louis	2.00
Aluminum	
Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	9.00 to 10.00
Borings, Cleveland	5.00 to 5.25
Mixed cast, Cleveland	5.00 to 5.50
Mixed cast, Boston	4.00 to 4.50
Mixed cast, St. Louis	4.25

Secondary Metals

Remelt aluminum No. 12	11.00 to 11.50
Brass ingots, 85-5-5-5	10.25

Metals

Most Prices Continue Steady Despite Extremely Light New Business—Copper Eases Off

New York—New business in nonferrous metals has been extremely light during the past week. Prices of most metals have been steady, but copper has eased off.

Orders for aluminum and for brass mill products have shown a little improvement in the past two weeks, but otherwise consumption of metals shows little change. The orders for brass are mostly specifications against contracts placed sometime ago.

Copper—New business at 10.50c, Connecticut, was extremely light, and so custom smelters cut to 10.25c. This has been the usual trend of events in the past few months. The market would hold for a brief period at the top of a rise after a buying movement, and then quickly slip back again. Opinions differ greatly on how far the market may recede this time, but some factors who have been inclined to minimize the strength of the market heretofore have said they expect to see less reaction than at other time in the last few months. Export business as well as domestic has been small.

Zinc—New buying has been extremely light but prices have held well. February statistics of the American Zinc Institute Inc. showed the continuation of a near-balance between production and shipments the past four months. Stocks last month were cut 687 tons to 144,489 tons.

Tin—Despite light demand, the price has firmed up again to above 37.00c. In view of the curtailment plans, holders of tin are not willing to sell freely. However, buyers are not sufficiently impressed to enter the market for any large quantities. They are fairly well covered on their early needs and see that stocks of tin are higher than ever before. Consumption of tin in the tin plate and automobile industries has increased moderately in the past few weeks.

Lead—New business is light, mostly in carlots for early shipment. Prices are steady.

Aluminum—Orders for aluminum are a little more active. Prices of new metal are unchanged.

Coke By-Products More Active; Prices Steady

New York—Demand has increased but prices of some distillates continue weak. Toluol after fluctuating for several weeks apparently has settled to 27.00c. Benzol continue to move at 19.00c, although a fair volume is sold at 20.00c. Xylol and solvent naphtha are unchanged and steady. Buying is heavier, reflecting increased activity by the automotive industry.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.85 to $1.90

Coke oven operations still are curtailed and stocks of by-products are not heavy. Spot business in naphthalene is satisfactory, taking up current production. Shipments on contracts are active. Phenol buying is more active and covers a wider range. Bakelite interests are more active. Sulphate of ammonia is unchanged with domestic buying holding well.

New York—Quicksilver is quiet, mostly about $101, for small spot lots, but some quotations are reported $1 to $2 higher, and others slightly lower.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
March 4	10.50	10.62½	10.25	26.70	27.10	4.60	4.35	4.05	22.90	7.00	35.00
March 5	10.50	10.62½	10.25	26.75	27.20	4.60	4.35	4.05	22.90	7.00	35.00
March 6	10.50	10.62½	10.25	27.17½	27.50	4.60	4.35	4.02½	22.90	7.00	35.00
March 7	10.37½	10.62½	10.12½	27.25	27.62½	4.60	4.35	4.02½	22.90	7.00	35.00
March 9	10.25	10.62½	10.00	27.37½	27.75	4.60	4.35	4.02½	22.90	7.00	35.00
March 10	10.25	10.50	10.00	27.12½	27.50	4.50	4.25	4.05	22.90	7.05	35.00

Europe

British Steelworks at 50 Per Cent—Decide to Label Product —France More Depressed

London—(*By Cable*)—British and Continental steelworks are making slow progress. Steel plants in the Middlesbrough district are operating at 50 per cent of capacity, while those in the Birmingham area work three days a week. Steel prices which are not controlled by various syndicates continue to weaken.

The British Steelworks association has decided on an identification mark to be placed on all British-made steel. Small orders for plates are being received from Canada. Tin plate is slightly firmer due to improvement in demand from the Continent. The market for pig iron continues depressed, exports remaining small.

A report from Brussels states iron and steel producers' order books are depleted and prices are weakening. Some sales are being made in India and China. No improvement is noted in Germany. Scandinavia is placing a few orders. The depression in France is increasing, according to STEEL's correspondent at Paris.

British Steel Demand Fails To Meet Mill Needs

Birmingham, Eng.—In the Middlesbrough district it is reported that makers have sold 2000 tons of ferromanganese to the United States. Middlesbrough iron is making little progress in the export market and even in Scotland cut prices fail to compete successfully against foreign iron. Steelworks have increased their output slightly and as orders have been placed for about 10,000 tons of railway chairs there should be a better prospect. It is believed the home railroads are about to place some heavy contracts for rails. Specifications for steel plates are slow and there is no increase in the capacity engaged on this class of steel.

The Birmingham market for steel and iron continues dull. Furnacemen and merchants are taking specifications for small lots of foundry pig iron but foundrymen hesitate to arrange forward business, partly because of slackness in their own works and also because of uncertainty of prices. Broadly speaking sufficient interest is not being displayed in Midland iron values to determine whether there is any real demand for another reduction. Furnacemen view the suggestion unfavorably. Previous concessions have brought no more business and present selling prices barely cover the cost of production.

Judging by inquiries and orders which Birmingham merchants are receiving for Continental material, little business is passing. It is obvious, however, that quoted prices are flexible and as works are in need of orders they would willingly concede 2s 6d ($.60). For billets delivered into the Black Country the lowest quotation is £4 7s 6d ($21.25) but it is quite likely that £4 5s ($20.65) would be accepted on an attractive proposition. This state of affairs applies generally to foreign materials and the low prices of billets, bars and strip appear to bear little relation to costs of production.

Tin Plate Output at 50 Per Cent

Rerollers in this district for the most part are overstocked and with the market definitely weak they are not disposed to commit themselves beyond a few tons.

Fluctuations in the tin plate industry of South Wales leave output at something like 50 per cent of capacity. One works has reopened after a stoppage of six months, namely the Morlais Tinplate Works, Llangenech, and the Kidwelly tin plate works has ceased to operate this week. A healthy sign is unfilled orders at some establishments. There is also some inquiry from Holland and Denmark. Prices are steady and vary between 15s 3d ($3.70) and 15s 9d ($3.82) per basis box, f.o.b. Swansea.

Makers of galvanized sheets are short of specifications and trade continues dull, not only in South Wales but in the Midland district. An interesting and encouraging feature of the return of oversea trade in January is that India took 8149 tons of galvanized sheets from Britain, compared with 4661 tons in the previous month.

This total is still only a fraction of the trade that is usually done in prosperous times. It indicates, how-

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, March 9	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.22	2 18 6*	$12.15	2 10 0	$12.15	2 10 0	$12.15	2 10 0
Basic-bessemer.....	14.58	3 0 0†	11.54	2 7 6	11.54	2 7 6	13.37	2 15 0
Hematite, Phos. .02-.05	17.01	3 10 0	.....	.....	.....	.....	17.01	3 10 0
SEMIFINISHED STEEL								
Billets.....	$26.73	5 10 0	$16.40	3 7 6	$16.40	3 7 6	$16.77	3 9 0
Wire rods.....	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails.....	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$31.59	6 10 0
Merchant bars.....	1.68c	7 15 0	.84c	3 16 6	.84c	3 16 6	.86c	3 18 0
Structural shapes.....	1.68c	7 15 0	.75c	3 8 6	.75c	3 8 6	.78c	3 11 0
Plates.....	1.79c	8 5 0	.97c	4 8 6	.97c	4 8 6	1.00c	4 11 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.93c	8 15 0
Sheets, gal., 24 ga. corr.	2.71c	12 10 0	2.23c	10 2 6	2.23c	10 2 6	2.31c	10 10 0
Bands and strips.....	2.06c	9 10 0	.98c	4 9 0	.98c	4 9 0	.99c	4 10 0
Plain wire, base.....	2.06c	9 10 0	1.13c	5 2 6	1.13c	5 2 6	1.16c	5 5 0
Galvanized wire, base..	2.39c	11 0 0	1.46c	6 12 6	1.46c	6 12 6	1.43c	6 10 0
Wire nails, base.....	2.39c	11 0 0	1.16c	5 5 0	1.16c	5 5 0	1.16c	5 5 0
Tin plate, box 108 lb...	$ 3.77	0 15 6	.....	.....	.....	.....	$ 8.75	1 16 0

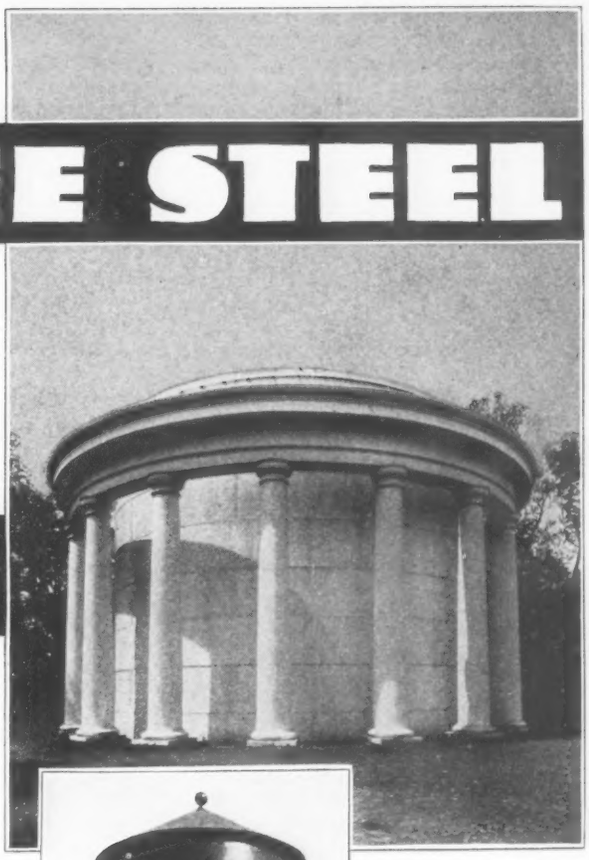
			French Francs		Belgian Francs		Renten Marks	
Domestic Prices at Works or Furnace—Last Reported								
Fdy. No. 3 Pig Iron**	$14.22	2 18 6	$11.37	290(2)	$13.11	470	$18.58	78
Basic pig iron.....	14.58	3 0 0	12.74	325(1)	12.28	440	20.36	85.50
Furnace Coke.....	2.92	0 12 0	6.19	158	5.02	180	5.10	21.40
Billets	26.73	5 10 0	19.21	490	18.00	645	26.31	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37c	127
Merchant bars.....	1.68c	7 15 0	.95c	530	.93c	715	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.92c	705	1.35c	125
Plates.....	1.95c	9 0 0‡	1.37c	760	1.09c	835	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.33c	1,295	2.34c	1,800	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.80c	1,555	2.73c	2,100	3.56c	330
Plain wire.....	2.06c	9 10 0	2.16c	1,200	2.15c	1,650	2.24c	257
Bands and strips.....	2.06c	9 10 0	1.25c	695	1.27c	975	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £12 0s 0d ($58.32) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

TENNESSEE STEEL

for Surface or Elevated

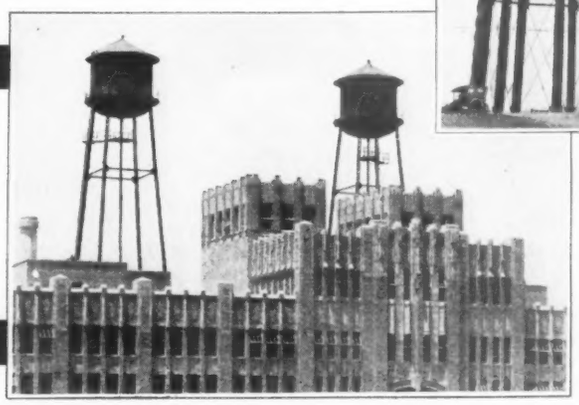
TANKS



When the tank-builder places emphasis on design and workmanship and the steel-producer places emphasis on quality--the tank will be *right*.

Remarkably attractive and convincing evidence of this fact appears in the accompanying illustrations of surface and roof tanks by Chattanooga Boiler & Tank Company and elevated tanks by R. D. Cole Manufacturing Company.

These and countless others constructed from TENNESSEE PLATES AND SHAPES.



Products: Structural Shapes, Plates, Bars and Small Shapes, Sheets, (Blue Annealed, Black and Galvanized), Rails and Accessories, Forgings, Castings, Semi-finished Materials, Pig Iron.

Tennessee Coal, Iron & Railroad Company

General Offices: Brown-Marx Building, Birmingham, Ala.

QUALITY PRODUCTS — Dependable Service

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES

American Bridge Company
American Sheet and Tin Plate Company
American Steel and Wire Company
Carnegie Steel Company
Columbia Steel Company
Cyclone Fence Company
Federal Shipbuilding and Dry Dock Company
Illinois Steel Company
Minnesota Steel Company
National Tube Company
Oil Well Supply Company
The Lorain Steel Company
Tennessee Coal, Iron & R. R. Company
Universal Atlas Cement Company

Pacific Coast Distributors—Columbia Steel Company, Russ Building, San Francisco, Calif. *Export Distributors*—United States Steel Products Company, 30 Church Street, New York, N. Y.

ever, that Indian buyers are more interested in British sheets despite severe price-cutting by Belgian makers, who are strongly competing for this market, and also the duty against British sheets. It is known that the production of the only company in India making steel sheets is insufficient for the needs of the market, and it is hoped that British manufacturers will steadily gain in their uphill fight for business in India.

Believe European Entente Will Be Re-established

Paris—Little has been heard about the European Steel Entente since the end of last year. It will be recalled that all that remains at present of the complicated structure which was set up by the summer of 1930 is the original Entente, whose sole object is to fix quotas of production for member countries, beyond which fines are imposed on those members responsible for excess production. The life of the Entente was provisionally extended until June 30 of this year at a meeting held Dec. 6, 1930, and a special committee was set up to study the conditions under which the Entente would be reorganized.

While the date of the next meeting which will consider this reorganization is not yet fixed, the special committee is meeting at frequent intervals, and notwithstanding various pessimistic rumors which occasionally are being spread, it is forecast in responsible quarters that the Entente will be re-established on a firm basis. The main reason for this optimistic attitude is because it is felt that unless European producers co-operate by means of a firmly-established international organization, iron and steel markets will be completely disrupted; and lack of agreement between the steel producers of Europe would result not only in the continuation of keen price competition, but also in a tendency to produce more steel than is required, which tendency would, of course, hasten the downfall of prices.

Only Three Syndicates Established

Apart from the rail, wire rod and tube syndicates, no other established organization exists between the European countries, with the exception of partial agreements between France and Germany, and between France, Luxemburg, the Saar territory and Germany.

For first quarter of this year the monthly tonnage allowed to the member countries is as follows: Germany, 964,000 tons; France, 660,000 tons; Belgium, 257,000 tons; Luxemburg, 176,000 tons; the Saar, 139,000 tons. Comparing these figures with the actual output of those countries in December, 1930, it is interesting to note that Germany is in a position to produce 220,000 tons more than she did in December, whereas France will have to reduce her production by 96,000 tons, Belgium by 14,000 tons, Luxemburg by 7000 tons and the Saar by 10,000 tons. It also is of interest to note that for the last quarter of 1930 France was the only country which exceeded its quota of production; since no limit was fixed for October, this applies to November and December, and France's excess production amounted to 49,000 tons. Taking into account the five member countries of the Entente, the aggregate output during the last months of 1930 was 301,000 tons below the quota, on the average.

The next meeting of the committee for fixing the tonnage program for second quarter is scheduled for March 11 at Dusseldorf. No accurate forecast of its decision can at present be made.

Belgian Steel Prices Are Too Low for Profit

Brussels—There is no improvement in the position of the Belgian iron and steel trade, and buyers are not purchasing beyond immediate requirements. Prices have dropped further in face of continued weakness in demand. Each week sees a fall in prices of about 1s (24c), and at present the rates of the various products traded in at the Brussels iron and steel exchange are practically equal to those prevailing in November. These prices are stated to result in a loss, even to the works having the lowest production costs. Orders are accepted only to give occupation to the works, and it is certain that if the present situation prevails for long many plants will be obliged to close down. Orders are scarce, as they are being held back on account of the steady fall in prices.

There is no sign of improvement in pig iron. No. 3 foundry pig iron is quoted at 450 francs ($16.20) for the domestic market and £2 11s ($12.34) for export. There is some business for semifinished products, especially for home consumption. Some of the transforming industries are buying blooms and billets and are offering firm orders at 600 to 620 francs, delivered works, for billets, and 500 francs for blooms.

Export Bookings at Low Ebb

The situation on the export market is quite different, and practically no orders are booked, but at the last meeting of the iron and steel exchange British buyers offered to buy 2-inch billets at £3 7s 6d ($16.35) f.o.b. Antwerp; no works have accepted this proposition, and up to now the following quotations seem to be steady: 6-inch blooms, £3 4s ($15.51); 2 to 2¼-inch billets, £3 9s ($16.71); 2½ to 4-inch billets, £3 7s ($16.23). Sheet bars are worth £3 10s to £3 11s ($16.95 to $17.19). Beams are fairly firm at £3 10s ($16.95) for normal sections and £3 11s ($17.19) for British sizes. French works have been selling heavy tonnages of beams.

The market for bars has failed to maintain its position. A little business has been done at £3 18s 6d to £3 19s ($18.99 to $19.11). The market for plates appears to have weakened still further. The wire department is in the same state as that of other departments. The output of wire rod in January was important, being at a quarterly rate of 50,000 metric tons, as compared with an average output of 35,000 tons for 1930.

British Trade Drops Off

London—Exports of pig iron and ferroalloys from Great Britain in January were 18,743 gross tons, compared with 19,458 tons in December, 1930. Of this total, 1480 tons were for ferroalloys, of which the largest tonnage, 1133 tons, went to the United States. Exports of other iron and steel products in January were the lowest registered for a number of years.

Imports of pig iron and ferroalloys into Great Britain in January were 23,345 gross tons, as compared with 36,023 tons in December, 1930, Imports of other iron and steel products totalled 198,428 gross tons, as against 247,015 tons in December, 1930, and consisted mostly of semifinished steel, principally from Germany, Belgium and France. Comparative figures follow, in gross tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron and ferro-alloys	Other iron and steel	Pig iron and ferro-alloys	Other iron and steel
1928	9,935	231,390	37,895	317,210
1929	12,310	222,410	45,430	319,520
1930	26,010	216,355	26,445	236,715
1931				
Jan.	23,345	198,428	18,743	148,630

British Iron at Low Mark

London—Production of pig iron in January amounted to 337,200 gross tons, the lowest since December, 1926, compared with 349,800 tons in December and 650,000 tons in January, 1930.

January output of steel ingots and castings totalled 402,200 gross tons, as against 337,200 tons in December and 771,100 tons in January, 1930. Comparisons follow, in gross tons:

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	338*	855,000	638,600
1928	132	550,800	710,000
1929	162	632,400†	803,000†
1930	76	516,400	608,200†
1931			
Jan.	83	337,200	402,200

(*) Average for year.
†Revised figures.

CHROMIUM

High-Carbon Ferrochrome (maximum 6% carbon)
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

MANGANESE

Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Manganese Metal
Silico-Manganese
Manganese-Copper
Silico-Spiegel
Miscellaneous Manganese Alloys

SILICON

Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 85%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% Silicon)
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon
Silicon-Copper
Silico-Manganese
Miscellaneous Silicon Alloys

TUNGSTEN

VANADIUM

All Grades

ZIRCONIUM

Aluminum-Zirconium
Ferro-Zirconium
Silicon-Zirconium
Zirconium-Ferrosilicon

Prevent slag inclusion
with CALCIUM-MANGANESE-SILICON

WHEN pouring steel from shank ladles, spots of slag normally rise to the surface of the metal in the ladle and, if not restrained, will flow with the metal into the mould and collect on the surface of the casting. Steel treated with Calcium-Manganese-Silicon in the bull ladle is remarkably free from these spots of slag.

Electromet Calcium-Manganese-Silicon is a combination of deoxidizing elements in proportions forming a very fluid slag. Due to its fluxing action in the bull ladle, the impurities are completely removed before the steel is poured into the shank ladle.

Electromet Engineers will gladly explain how you can profit most by the use of this and other Electromet Ferro-Alloys.

Sole Distributors

ELECTRO METALLURGICAL SALES CORP.

Unit of Union Carbide UCC *and Carbon Corporation*

Carbide and Carbon Building, 30 East 42nd Street
New York, N. Y.

Electromet
Ferro-Alloys & Metals

Machinery

PLANTS manufacturing automobiles and electrical equipment furnish encouragement needed to counteract the persistence with which railroads refuse to release substantial machine tool orders. Being a key month in the machine tool business, March conditions are viewed with alarm in some districts and with satisfaction in others—the average opinion being that things are coming along about as well as can be expected. With the exception of tools for the new plant of Simonds Saw & Steel Co., Fitchburg, Mass., new projects are scarce. This causes orders which continue to be placed by Russian interests to stand out in bold relief.

New York—Machine tool buying and inquiry shows little change. Increased activity which started early in the year holds up well, although there are recurring periods of dullness. The outlook on the whole is more promising, as inquiries show evidences of being closed. Some dealers and builders noted a slight slowing up during the first week of this final month of the quarter, but believe it to be temporary. Most of the buying is for replacement, there being little demand for tools in connection with expansion programs, except in the case of Simonds Saw & Steel Co., Fitchburg, Mass., which is placing a fair list of tools in this territory for its plant now under construction. This company started buying several weeks ago and considerable equipment has yet to be placed. Russian buying has taken another spurt. Equipment for an automotive plant is being placed through the Amtorg Trading Corp., this including a fair amount of grinding machinery. Governmental departments also continue active.

Worcester, Mass. — More Russian business is in sight for the larger as well as the smaller makers of grinders. The domestic market remains relatively quiet, although one maker of auto piston ring grinders has just landed a large order in the Middle West and has another lot of machines going to France for a Russian agency.

Demand for lathes and drills remains about the same, New England itself furnishing but little incentive. Small tools are selling slowly. Production of textile machinery is moving along ahead of the general machine market under the stimulus of increased production of textiles.

Pittsburgh — Machine tool sellers are encouraged by a further increase in inquiry. Orders show little change and while improvement since a month ago has been only moderate, pending work is heavier and interest on the part of users in new equipment is more diversified. What activity there is continues to be along the line of small, individual lots, orders usually involving single tools. The crane market continues to be equally quiet.

Cleveland—Activity among manufacturers of electrical equipment is becoming marked in the Cleveland district and is leading to some encouraging machine tool business. Additional orders placed by Russian interests also are having a desirable effect upon the situation. Otherwise the market is featureless, with builders and dealers working hard to close orders which persistently are withheld by cautious prospects.

While industrial employment has not improved to any marked degree, the general situation has been relieved greatly by various emergency measures. It is expected that such measures can be kept in force until the industrial labor market begins to take up the load—a condition which appears to be near at hand.

Builders of material handling equipment, of whom there are many in this district, count confidently upon the second National Industrial Equipment exposition, to be held here April 13-17, to give substantial impetus to their business.

Chicago—Entering March, which ordinarily is one of the most active months of the year, with a light sales volume and scattered inquiries, machine tool dealers are inclined to see little promise immediately ahead. Views expressed by some are to the effect that no real upturn can be expected before October, unless March business develops more vigor than it has shown thus far. Individual inquiries have picked up in the last few days, being comparable to the first week in February.

Chicago Great Western is purchasing additional items against its list, but the other railroads are quiet, and no new railroad lists of consequence are being sent out. Few large machine tools were purchased during the week, but a number of orders covering presses and other light production and servicing equipment were closed. Chicago & North Western is asking bids on a few small items, which total less than $1000. Prices on the whole are untested and no changes are being announced.

Machine Industry Seen As Business Barometer

Washington—Machinery has come to play such an important role in the industrial life of the world that the degree of activity in the machinery industry provides a reasonably accurate business barometer, according to W. H. Rastall, chief, industrial machinery division, department of commerce.

In his annual survey, Mr. Rastall reveals that annual world consumption of machinery now reaches the enormous total value of $5,500,000,000. The United States accounts for $2,500,000,000, which means for every man, woman and child in this country, there is installed each year $23 worth of machinery. This per capita figure for Great Britain amounts to $10; for Germany $9; while for India it is 17 cents, and for China only 5 cents. The machinery industry throughout the world affords employment to 500,000 men each in the United States, Great Britain and Germany and to about 250,000 in Japan. The United States produces 57 per cent of the world's annual output, Great Britain and Germany each about 13 per cent.

Approximately a billion dollars worth of machinery each year enters international trade. Of this the United States furnishes approximately 35 per cent. Considering only industrial machinery, used in factories, mines and for construction, United States exports in 1929 exceeded $257,000,000 in value, an increase of 22.7 per cent over 1928 and far in excess of all years since the war and post-armistice periods.

Metalworking machinery ranked first among the various types of American industrial machinery exported in 1929, with a value of $41,000,000. Construction and conveying machinery came next, with nearly $26,400,000. Oil well and refining machinery, after averaging around $16,000,000 a year in 1926, 1927 and 1928, passed the $25,000,000 mark in 1929. Foreign sales of mining and quarrying machinery attained a value of nearly $18,000,000, an increase of 70 per cent over 1925. Steady progress has been made in exports of textile machinery, which in 1929 totaled nearly $13,700,000.

It is a significant fact that since 1918 Asia and Latin America have absorbed machinery valued respectively at $1,000,000,000 and $75,000,000.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

CHESHIRE, CONN.—Connecticut state reformatory proposes to build a shop for the manufacture of markers. Approximate cost, $40,000.

BOSTON—Massachusetts National Guard, state building, plans to build a 2-story air corps building at the municipal airport. Cost is estimated at $250,000.

BOSTON — The Somerville Iron Foundry Co., M. D. Bingham president, 83 Washington street, Somerville, Mass., will receive bids for a 1-story plant to be built on Mystic avenue. Unit will be 55 x 150 feet, and will cost about $50,000. Plans are private.

CAMBRIDGE, MASS.—A. L. Ross, 79 Pearl street, is reported to be in the market for a 6 x 24-inch single-surface planer.

FALMOUTH, MASS.—City council is reported to plan the purchase of pumps for a pumping station soon to be erected. Estimated cost, $22,000.

OAKLAND, ME.—Getchell Foundry & Machine Co., C. W. Getchell manager, plans to rebuild its one and 2-story plant, recently noted as damaged by fire. Plans are private. Cost is estimated at $50,000. (Noted Jan. 22.)

PORTSMOUTH, N. H.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5209 for two motor-generator sets with appliances and parts.

NEWPORT, R. I.—Bureau of yards and docks, navy department, Washington, is having plans prepared for an assembly plant addition at the naval torpedo station here. Estimated cost, $125,000.

LYNDONVILLE, VT. — Vermont Tap & Die Co. is a new industry recently established here.

New York

ALBANY—Sweeney Mfg. Co. has been incorporated with $50,000 capital by E. L. Kane, to manufacture waffle irons.

BROOKLYN—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5262 for one jig saw.

BROOKLYN—Plant of the Ericsson Screw Machine Products Co. Inc., 630 Dean street, recently was damaged by fire.

ELMIRA — Hardinge Brothers have been incorporated with $450,000 and 4500 common shares by Mandeville, Waxman, Buck, Teeter & Harpending, attorneys, to operate a machine shop.

ENDICOTT—International Business Machines Corp., 270 Broadway, New York, plans a 4-story plant addition, 50 x 56 feet, here. Plans are private. Approximate cost, $150,000.

JAMESTOWN—Julin Combination Windows Inc. has been incorporated with $75,000 capital to operate a local plant for the manufacture of steel and hollow metal window frames and other galvanized and corrugated metal products. John Rockman, Harvey M. Parker, and Karl J. and Clarence E. Julin are interested.

NEW YORK—Metal Awning Corp. has been incorporated with $25,000 capital by J. M. Marlow, 225 West Thirty-fourth street.

NEW YORK—Bureau of yards and docks, navy department, Washington, will expend about $80,000 for power plant alterations and equipment for the navy yard here.

NEW YORK—Paramount Bronze & Steel Corp. has been incorporated with $60,000 capital by C. W. Hastings, 33 Rector street, to deal in building materials.

NEW YORK—Ever Ready Fire Equipment Co. has been incorporated with $2500 and 150 common shares by Anton Korwan, 160-16 Jamaica avenue, to make fire extinguishers.

New Jersey

NEWARK—Meyer-Lewis Corp., 244 South street, has taken over the plant formerly occupied by the Peckham Mfg. Co., at the above address. Company will manufacture metal goods.

RED BANK — Exhaust Extension Co. has been incorporated with $50,000 capital by Henry D. Brinley to manufacture automobile parts.

Pennsylvania

COLUMBIA — Keystone Laundry Machinery Co. has been incorporated with $50,000 capital by Stanley E. Wiley, Teaneck, N. J., to manufacture, rebuild and install laundry machinery.

COUDERSPORT—Roundhouse of the Coudersport & Port Allegany railroad recently was damaged by fire, with loss estimated at $100,000. Equipment was included in the loss.

ERIE—Erie Foundry Co., D. W. McDonald secretary, 1253 West Twelfth street, will erect a machine shop, 80 x 160 feet, plans to mature about June 1. Estimated cost, $40,000.

FERNWOOD—Plant of the Hartford Sterling Co., manufacturer of silverware, Sixth street and Baltimore pike, recently was damaged by fire.

LANCASTER—General Lock Corp. has been incorporated by S. C. Slaymaker, 1024 Marietta avenue, to manufacture and sell locks and light hardware.

LANCASTER—Economy Rock Bit Corp. has been incorporated with $50,000 capital by I. L. Rutt, Paradise, Pa., to manufacture and deal in drills, tools and devices.

MIFFLIN—Board of county commissioners, J. Armstrong chairman, Pittsburgh, will build a hangar, 105 x 152 feet, and an auxiliary building, 30 x 197 feet, near here. Cost, including construction of administration and office building, $225,000. S. Roush, 519 Smithfield street, Pittsburgh, is architect.

PHILADELPHIA—Morris Stein has leased a 3-story plant at 73 Laurel street for the manufacture of metal utensils.

PHILADELPHIA—Duoflex Piston Ring Co., Fifteenth and Mt. Vernon streets, will build a plant addition, 20 x 66 feet, at Seventy-first street and Kingsessing avenue. Plans are by H. B. Tobias, architect, 112 South Sixteenth street.

PHILADELPHIA — Maintenance department of Jewish Hospital will erect a shop building at a cost of about $13,000. Contract is held by E. E. Hollenback Inc., 1910 North Marshall street. Plans are by Silverman & Levy, Thirteenth and Chestnut streets.

PITTSBURGH—American Steel Foundry Co., Thirty-sixth and Smallman streets, has a building permit for erection of a craneway at a cost of about $5000. Contract is held by Pittsburgh Bridge & Iron Works, Fulton building.

WELLSBORO—Industrial committee of the chamber of commerce has initiated negotiations for securing a foundry and machine shop, equipped for the manufacture, repair and maintenance of gas equipment.

WILMERDING—Westinghouse Valley Sign Mfg. Co., 98 Bridge street, has been incorporated with $25,000 capital by James Volpe, 116 Bridge street, to manufacture electric illuminated signs.

Ohio

AKRON—Ohio Edison Co. will build an addition to its Beech street

steam plant and install a new boiler.

CLEVELAND—Metal Surfaces Inc. has been incorporated with $5000 capital by D. M. Bader, 613 Ulmer building. H. A. Brewer, 4312 East 139th street, is interested.

DAYTON—Advance Foundry Co., 100 Parnell avenue, has closed bids for construction of a storage unit and is having plans prepared for a plant addition. C. A. Hock, 309 Realty building, is architect.

FREMONT—Herbrand Co., Stanley E. Boyer president and general manager, is constructing a new forge unit, 47 x 122 feet. Unit will be completed in about 90 days. Six hammers formerly used in another plant will be moved to the new building.

FREMONT—Aerio Coal Burner Mfg. Co. is being organized here by Carl F. Steinle and Stanley M. Wolfe of the Steinle-Wolfe Construction Co. Company is to be affiliated with Aerio Coal Burner Inc., 854 Michigan Theater building, Detroit, the local organization to handle production. Floor space has been leased in the Clauss Shear Co. building. Foundry and machine work is to be undertaken by local concerns.

STEUBENVILLE — City council proposes to purchase pumps in connection with waterworks improvements. Approximate cost, $75,000.

STEUBENVILLE — Machine shop and power house of the Wheeling Township Coal Co. at Adena, near here, recently were damaged by fire, following an explosion. Damage is estimated at $30,000.

YOUNGSTOWN — Mahoning Valley Heating Co. has been incorporated by H. B. Doyle, 1110 Mahoning Bank building, to manufacture and deal in furnaces, fittings, fans, registers, tools, and to do machine work.

Indiana

ANDERSON—Smith Steel Casting Co., Jefferson street, advises through K. Smith, president, that all equipment and machinery has been secured, except small tools. (Noted March 5.)

BLOOMINGTON—County commissioners will build a power house and install equipment, at a cost of about $75,000. A. Grindle is engineer.

INDIANAPOLIS—W. J. Holliday & Co., 545 West McCarty street, has let contract for erection of a plant at Missouri and Georgia streets to Brown & Mick, 1020 East Michigan street. Estimated cost, $40,000.

LAFAYETTE—Rush Mfg. Corp. has been incorporated with $450,000 capital by Leo E. and Joseph H. Rush, to manufacture and deal in metal products.

SOUTH BEND—Sibley Machine Works will let contracts soon for a 1-story foundry unit, 80 x 100 feet. Plans are by Frank D. Chase Inc., 720 North Michigan avenue, Chicago.

WASHINGTON—City will award contract for a new power plant and equipment. Plans are private. Estimated cost, $40,000.

Michigan

DETROIT — D. A. Chamberlain, 5237 Loraine avenue, is reported to be in the market for a thread-cutting bench lathe.

DETROIT—Miller Corp. of America, 1545 Temple avenue, has been incorporated with $2000 capital by J. P. Waldecker, 2157 Lansing street, to manufacture and sell castings, machine work and patterns.

DETROIT—Board of commissioners, L. P. Fisher chairman, 735 Randolph street, will receive bids March 24 for a group of buildings, to include machine shop and storage unit. G. H. Fenkell is general manager and chief engineer.

LAPEER—Winn Trailer Corp., organized by S. B. Winn and Henry W. Raymond, formerly of the Lapeer Trailer Corp., plans to start production of truck trailers about May 1. Joseph Kutter is chief engineer and Ralph McCartney plant superintendent.

MONROE—Pattern works of Vincent Schnorberger recently was damaged by fire, with loss estimated at $15,000.

Illinois

BATAVIA—Batavia Body Co. has been incorporated with $250,000 capital by Walsh & Walsh, to deal in automobile bodies. W. G. Forest, A. T. Jackson and W. M. Vogel are interested.

CHICAGO — American Manifold Corp., 2900 Darwin terrace, has a building permit for the erection of a 1-story addition, 25 x 80 feet.

CHICAGO — Monarch Lamp Co., 1512 South Michigan avenue, has been incorporated with $50,000 capital by Cohen, Tomas & Cohen, 19 South LaSalle street, to manufacture lamps.

CHICAGO—Commonwealth Edison Co., 72 West Adams street, has let contracts for a 3-story service building, 38 x 124 feet, to be erected at 2201 Throop street. Cost is estimated at $45,000.

ITASCA—City has awarded contract to Giellefeld Construction Co., Forest City, Iowa, for construction of a pumping plant. Estimated cost, $135,000.

Southern States

BIRMINGHAM, ALA.—Plant of the Butcher Hardware & Tool Co., 2018 Second avenue north, recently was damaged by fire. Loss, covered by insurance, is estimated at $25,000.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids, for delivery at various points, on March 17 for four turbo-generator sets on schedule 5183; for one diesel generator set on schedule 5195; for eight vertical turbine-driven forced draft blowers on schedule 5196. Bids will be received March 31 for one universal milling machine on schedule 5317 and for one floor type drill press on schedule 5318.

MIAMI, FLA.—Pan American Airways Inc., 122 East Forty-second street, New York, will build a seaplane base on Dinner Key, near here, under the direction of Capt. L. L. Odell, chief airport engineer. First unit, to cost $50,000, will be a hangar. Later construction will include a group of two and a group of three hangars, and a machine shop.

MACON, GA.—Clark Monumental Works of America, C. J. Clark president, will build a plant on a site on Forsyth road near Crumps park. Main plant will be 40 x 140, first unit to be a shop.

THOMSON, GA.—Thomson Light & Water Co. is having plans prepared for power plant improvements. Diesel engine and accessories will be installed.

HARLAN, KY.—City has preliminary plans for erection of a new power plant. Burns & McDonnell Engineering Co., 400 Interstate building, Kansas City, Mo., is engineer.

BALTIMORE—Harry C. Weiskittel & Co. Inc. will proceed with erection of a gas range manufacturing plant here, recently noted. Site covers 24 acres. Plant and office unit to be erected will be 180 x 300 feet. Later construction will include an assembly plant, 80 x 260 feet. (Noted Jan. 15.)

CHATTANOOGA, TENN. — Plant of the Superior Foundry & Mfg. Co., Twenty-ninth street and Alton Park boulevard, recently was slightly damaged by fire. Loss is estimated at $2250.

MEMPHIS, TENN.—U. S. Engineer office, 1006 McCall building, will receive bids April 15 for construction of two 32-inch channel dredges of the dustpan, suction-head type. Boilers, pumps, cranes, engines and turbines will be required.

HAMPTON ROADS, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5269 for one screw machine and on schedule 5270 for one screw cutting engine lathe.

BONCAR, W. VA.—Electro-Metallurgical Co., 30 East Forty-second street, New York, has under construction here a 2-story mix house, 840 feet long. Estimated cost, $300,000. Other units are planned.

Missouri

CAPE GIRARDEAU—Marquette Cement Mfg. Co., 140 South Dearborn street, Chicago, is reported to plan improvements and alterations at its local plant. Work will include installation of grinding and conveying machinery, boilers and generating units. Burrell Engineering & Construction Co., 1 North Canal street, Chicago, has the general contract.

KANSAS CITY—United Engineering Works Inc. has been incorporated with $40,000 capital by J. A. Whitehead, 3347 Gillham road.

Oklahoma

MIAMI—City department of public utilities advises through H. G. Freehauf, superintendent, that contract has been awarded to Muskogee Iron Works, Muskogee, Okla., for the hangar to be built at municipal airport, for leasing to G. M. Coleman. Unit will be 80 x 120 feet, with lean-to 20 feet wide, construction to be completed soon. (Noted March 5.)

TULSA—Erie Meter Systems Inc., Erie, Pa., manufacturer of gasoline pumps and filling station equipment, has purchased a plant here for a branch unit. About 100 men will be employed.

TULSA—State highway commission, capitol building, Oklahoma City, Okla., will receive bids soon for construction of a machine shop here. Unit will be 40 x 75 feet. Dudley Jones, Tuloma building, Tulsa, is division engineer in charge.

TULSA—Magic City Improvement Co., Charles G. Boone shop manager, 1414 East Fourth street, whose organization recently was noted, will purchase lathes, drill presses, milling machines, broaching machines and other equipment in connection with a new shop to manufacture oil well pumps. (Noted March 5.)

Texas

GALVESTON—Gulf, Colorado & Santa Fe railroad has closed bids for improvements here, to include the construction of a 29 x 52-foot boiler house. K. B. Duncan is chief engineer.

HOUSTON — Southern Engine & Pump Co., 615 Washington street, will build a warehouse and repair shop, 100 x 100 feet.

Wisconsin

APPLETON — Riverside Paper Corp., 800 South Lawe street, is considering expansion of power facilities. Survey is being conducted by Charles A. Cahill & Sons, engineers, 724 East Mason street, Milwaukee.

Minnesota

REDWOOD FALLS—City, F. B. Forbes clerk, has preliminary plans for the construction of a pump house and installation of equipment. L. P. Wolff, 903 Glove building, St. Paul, is engineer.

North Dakota

COLUMBUS—Montana-Dakota Power Co., Minneapolis, Minn., plans power plant extensions here to cost approximately $250,000.

Nebraska

LINCOLN—E. G. Stage has under construction an enlarged plant for steel fabrication, located between Nineteenth and Twenty-first streets. Capacity of the plant will be about 300 tons per month. Facilities will be provided for fabrication of structural steel and tank plates.

Colorado

GRAND JUNCTION—Redlands Co., R. B. Dessert president, subsidiary of Cities Service Co., 60 Wall street, New York, plans development of a hydroelectric project here. Plans call for the installation of a 1500-kilowatt turbine.

PUEBLO—Nelson Aircrafts Inc., whose incorporation recently was noted, advises that the company is engaged in the development and production of a helicopter on a commercial basis. W. G. Nelson is president. Temporary offices are located at 202-5 Colorado building. Present activity is confined to experimental and development processes. (Noted Feb. 19.)

Arizona

TUCSON—Tucson Gas, Electric Light & Power Co., M. A. Pooler manager, will expend approximately $400,000 on power plant improvements recently noted, including installation of a diesel unit. (Noted Dec. 4.)

Pacific Coast

FAIRFIELD, CALIF.—City proposes to make waterworks improvements, including installation of a pump, upon approval of $38,000 bond issue.

LOS ANGELES—Consolidated Steel Corp., 1200 North Main street, will build a 1-story welding shop, 120 x 750 feet, on Slauson avenue. Plans are being prepared. Work will be done by owner's forces.

MARE ISLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 24 on schedule 5282 for one automatic motor-driven mortiser, and on schedule 5293 for one motor-driven surfacer machine.

SAN DIEGO, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5257 for one 60-ton hydraulic press, and on schedule 5263 for one motor-driven rotary shear.

SAN FRANCISCO—San Francisco Bay Airdrome, R. U. St. John manager, is reported to plan the erection of two hangar units, at a cost of approximately $75,000.

TULARE, CALIF.—Tulare utility district is considering establishment of a fund of $3,000,000 for a power plant and system.

BREMERTON, WASH.—Bureau of yards and docks, navy department, Washington, proposes power plant improvements at the Puget Sound navy yard, to cost $75,000.

BREMERTON, WASH.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5281 for one motor-driven metal cutting band saw. Bids will be received March 24 on schedule 5276 for two motor-driven lathes, and on schedule 5287 for one motor-driven dove-tailing machine.

ELLENSBURG, WASH. — Fulton Construction Co. is building an office and shop building at Fourth and Water streets.

EVERETT, WASH.—Covada Consolidated Mines Inc. has been incorporated with $50,000 capital by F. C. Webster and O. A. Zabel, 629 Dexter Horton building, Seattle, to engage in metalliferous mining.

OLYMPIA, WASH.—H. S. Royce, Tacoma, Wash., has applied for a permit to construct a $3,000,000 power project on the Lewis river in Clark and Cowlitz counties. It is planned to develop 10,000 horsepower.

SEATTLE—Ballard Iron Works Inc. has been incorporated with $16,000 capital by E. C. Henning and associates.

SEATTLE—Orchard Machinery Co. has been incorporated with $50,000 capital by Frank E. Hammond, attorney.

SEATTLE—Pacific Coast Steel Co., 215 Market street, San Francisco, will build a storage and distributing plant here. Approximate cost, $80,000.

SEATTLE—Bureau of supplies and accounts, navy department, Washington, will receive bids March 17 on schedule 5213 for one motor-driven band saw.

SPOKANE, WASH. — Tungsten Mines Inc. has been organized with $200,000 capital by H. D. Farris, 221 Eagle building.

VANCOUVER, WASH. — Boilers, motors, engines and other equipment will be purchased by the Washington Canners Co-Operative association for installation in a new plant about to be erected. Cost of the project is estimated at $75,000.

Dominion of Canada

PENTICTON, B. C.—Pacific Pipe & Flume Works, Winnipeg street, has awarded contract to Etter & Pearson for the erection of a 1-story iron pipe shop at its plant. Unit will be 30 x 100 feet.

VANCOUVER, B. C.—Northwestern Power Co., 200 Electric Railway Chambers, Winnipeg, Man., E. Anderson president, has plans for a substation, 36 x 90 feet, to be erected here. Approximate cost, $300,000.

ST. JAMES, MAN.—Hangar, equipment and planes of the Western Canada Airways at Stevenson field recently were damaged by fire. Loss, including nine planes, is estimated at $1,000,000.

HALIFAX, N. S.—Neon Tube Lights (Maritime) Ltd., 425 Roy building, J. E. McLurg president, advises that the company is not building a plant, but is leasing a site upon which a plant is being erected by other interests. (Noted March 5.)

BELLEVILLE, ONT.—Acimite Insulation Co., Toronto, Ont., has purchased the former plant of the Tiger Rubber Co. and will remodel and equip it for the manufacture of insulating materials.

KINGSTON, ONT. — Colonial Bus Lines plans to erect a service shop here at an approximate cost of $25,000.

KINGSTON, ONT.—Crescent Wire & Iron Works Ltd., 650 Princess street, will build a plant addition and install additional equipment. Cost is estimated at $50,000.

NEWMARKET, ONT.—Dixon Pencil Co., Wayne and Monmouth streets, Jersey City, N. J., will alter a building here formerly occupied by the William Crane Co., and will purchase equipment.

OTTAWA, ONT.—Pritchard & Andrews Co., 264 Sparks street, recently started production, manufacturing brass and aluminum castings. H. M. Pritchard is secretary.

OTTAWA, ONT.—Castings of Canada Inc. has been incorporated with $250,000 capital by Norman McCallan, to carry on the business of ironmaster and manufacturer of steel and iron.

SAULT STE. MARIE, ONT.—Algoma Steel Corp., J. D. Jones general manager, will install a combination mill which will enable it to handle heavy structural steel as well as heavy rails. Next equipment to be installed will be that for rolling structural steel sections up to 12 and 15 inches.

TORONTO, ONT. — Superior Concrete Block Co. will start work immediately on erection of a plant on Roselawn avenue for the manufacture of concrete blocks and shingles. Thomas Strang, 698 Rushton road, is president.

STRATHROY, ONT.—Utilities commission will recondition the power plant here at a cost of about $20,000, and install new equipment.

LACHINE, QUE.—Jenkins Bros. Ltd., 617 St. Remi street, Montreal, Que., manufacturer of valves, advises through James H. Webb, vice president and managing director, that bids have not yet been called for a new plant unit recently noted. Iron and bronze foundry is planned for erection next summer. (Noted March 5.)

MONTREAL, QUE. — Two steam boilers, 25-horsepower each, and four 17½-horsepower electric motors will be purchased by Canadian Crown Cork Ltd., 739 Mountain street.

New Trade Publications

BELTS—L. H. Gilmer Co., Tacony, Philadelphia, has issued a bulletin on its endless woven fabric belts for high speed use with small pulleys.

ROTARY PUMPS—Vickers Inc., 7752 Dubois street Detroit, in Bulletin 31-1 tells advantages of its V-type rotary pumps for hydraulic control systems. Illustrations, charts and data tables tell the story.

HIGH-SPEED TOOL BITS—Vincent Steel Process Co., 2434 Bellevue avenue, Detroit, is presenting in a current leaflet the claims of its high-speed tool steel for bits to give long service.

NICKEL STEEL—No. 5 in its series on the use and applications of nickel steel has been issued by the International Nickel Co. Inc., New York. It is devoted to automotive, railroad, aeronautical, petroleum, mining, power and miscellaneous uses.

STEAM PURIFIER — Schutte & Koerting Co., Philadelphia, in Bulletin 9-p illustrates and describes its diffuser steam purifier, external type. Color is used to indicate various fluids and gases in cross sectional views of the devices

BELT DRIVES—Rockwood Mfg. Co., Indianapolis, has issued a book of specifications for standard short-center flat belt drives from one to 50 horsepower. It is made up largely of specification tables, with illustrations of applications to various types of machinery.

UNIT HEATERS—Young Radiator Co, Racine, Wis., has issued a booklet, No. H-1230, describing its complete line of unit heaters. The line includes units for small and large installations, with single and multiple speed units, single motor and dual motor.

PUMPS — Worthington Pump & Machinery Corp., Harrison, N. J., has issued four recent bulletins, as follows: Vertical four-cylinder, direct-injection diesel engines, Bulletin S-500-B5; horizontal duplex piston pumps, specification sheets W-112-S6 and S9; vertical triple single-acting power pumps, D-423-S9.

STEAM AND POWER PUMPS—A new catalog has been prepared by the Weinman Pump Mfg. Co., Columbus, O. It is made up of bulletins on the various types of pumps, enclosed in a binder. Each bulletin is well illustrated and sufficient data are given to indicate the use for which it is best fitted.

LUBRICATION—Diesel engine lubrication is the subject of the current issue of the lubrication magazine published by the Texas Co., New York. Diagrams and halftones illustrate the text. The problems of lubricating this type of engine are discussed, with special reference to bearing and air compressor requirements.

MOLYBDENUM — Climax Molybdenum Co., 295 Madison avenue, New York, in a recent bulletin tells of the application of molybdenum to the improvement of cast iron. Results of addition of this element to cast iron are discussed and numerous charts and microphotographs show graphically the changes it works. Supplements are to be issued in future as new information is developed.

SAWS AND FILES—A booklet by Henry Disston & Sons Inc., Philadelphia, supplants the former issue of the Disston saw, tool and file book. Its purpose is to instruct the user in the selection, care and use of saws, tools and files. Illustrations assist in making the text clear. The chapters cover circular saws, band saws, hack saws, scrapers, files. Full instruction is given on proper methods of filing saws.

CONSTRUCTION EQUIPMENT—Chain Belt Co., Milwaukee, has issued three catalogs dealing with equipment using chain belt, as follows: Catalog 204, building mixers, pumps, saw rigs, plaster and mortar mixers; Catalog 206, paver and road pump; Catalog 205, concrete mixers of wet, dry and shrinkage types, including mixers, remixers and moto-agitators. It also includes engineering data on elevators and belt conveyors.